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# A revision of the genus *Helotrephes* STÅL, 1860 (Insecta: Heteroptera: Helotrephidae) with descriptions of twelve new taxa from the Oriental Realm

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## Abstract

The East-Oriental genus *Helotrephes* STÅL, 1860 is taxonomically revised. Eleven species and one subspecies are described as new: *Helotrephes affinis* sp.n. (Thailand: Songkhla), *H. australis* sp.n. (Thailand, Laos, peninsular Malaysia), *H. flaviceps* sp.n. (Thailand: Mae Hong Son, Songkhla, Yala), *H. incisus* sp.n. (Thailand: Phetchabun, Chiang Mai), *H. javanicus* sp.n. (Indonesia: Java), *H. kodadai* sp.n. (Malaysia: Sarawak), *H. major* sp.n. (Thailand: Chiang Mai), *H. nieserianus* sp.n. (Thailand: Mae Hong Son, Chiang Mai; Laos: Luang Nam Tha), *H. porntipae* sp.n. (Thailand: Chiang Mai), *H. semiglobosus hainanicus* ssp.n. (China: Hainan), *H. shepardi* sp.n. (Thailand: Chiang Mai, Phetchabun; Vietnam: Vinh Phu), and *H. tuberculatus* sp.n. (Thailand: Phetchabun; China: Hainan). Five species groups are defined, which are considered to be monophyletic. *Helotrephes formosanus* ESAKI & MIYAMOTO, 1959, is ranked as a subspecies of *H. semiglobosus* STÅL, 1860 (stat.n.). *Helotrephes* presently contains fifteen species and two subspecies.

**Key words:** Helotrephidae, *Helotrephes*, new species, new subspecies, new status, species groups, taxonomy, Oriental Realm, Thailand, Malaysia, Laos, Vietnam, China, Indonesia, Taiwan, Borneo, Java, Hainan.

## Zusammenfassung

Die ost-orientalische Gattung *Helotrephes* STÅL, 1860 wird taxonomisch revidiert. Elf Arten und eine Unterart werden neu beschrieben: *Helotrephes affinis* sp.n. (Thailand: Songkhla), *H. australis* sp.n. (Thailand, Laos, West-Malaysien), *H. flaviceps* sp.n. (Thailand: Mae Hong Son, Songkhla, Yala), *H. incisus* sp.n. (Thailand: Phetchabun, Chiang Mai), *H. javanicus* sp.n. (Indonesien: Java), *H. kodadai* sp.n. (Malaysia: Sarawak), *H. major* sp.n. (Thailand: Chiang Mai), *H. nieserianus* sp.n. (Thailand: Mae Hong Son, Chiang Mai; Laos: Luang Nam Tha), *H. porntipae* sp.n. (Thailand: Chiang Mai), *H. semiglobosus hainanicus* ssp.n. (China: Hainan), *H. shepardi* sp.n. (Thailand: Chiang Mai, Phetchabun; Vietnam: Vinh Phu), und *H. tuberculatus* sp.n. (Thailand: Phetchabun; China: Hainan). Es werden fünf Artengruppen definiert, die als monophyletisch erachtet werden. *Helotrephes formosanus* ESAKI & MIYAMOTO, 1959, wird als Unterart zu *H. semiglobosus* STÅL, 1860, gestellt (stat.n.). *Helotrephes* enthält derzeit fünfzehn Arten und zwei Unterarten.

## Introduction

The species of the genus *Helotrephes* STÅL, 1860, are rather large sized representatives of the family Helotrephidae. Together the genera *Esakiella* CHINA, 1932 (from Africa and Madagascar), *Hydrotrephes* CHINA, 1935 (Oriental inclusive of Wallacea), *Heterotrephes* ESAKI & MIYAMOTO, 1959 (East Palaearctic), *Pseudohydrotrephes* POISSON, 1956

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(Madagascar), and *Helotrephes* comprise the tribe Helotrephini as defined by POLHEMUS (1990). The relationships between these genera are not yet well understood. The Helotrephini are a well defined monophyletic group, whereas the Helotrephinae as presently construed may be paraphyletic or polyphyletic (ZETTEL 1997a).

Numerous recently discovered species of *Helotrephes* and *Hydrotrephes* show an enormous variation of characters previously thought to be possibly generically diagnostic. Therefore the differentiation of the two genera in the present sense is pragmatic and may be without phylogenetic value. A more formal character analysis and a phylogenetic analysis are needed to settle this question. The primary (and so far the only reliable) character to distinguish *Helotrephes* and *Hydrotrephes* is the development of the median abdominal carinae, which in *Helotrephes* extend posteriad onto sternite 5 or 6, but only onto sternite 3 in *Hydrotrephes*. Another useful character is the development of the right paramere, which is long and subequal in length to the left paramere in *Helotrephes* (plesiomorphic state) (slightly reduced in the *H. jendeki* group and *H. sausai* ZETTEL, 1995), but distinctly shortened in *Hydrotrephes* (apomorphic state). Unfortunately, this difference is not consistent for all *Hydrotrephes* s.l. species, although it is present in the type species of *Hydrotrephes*, *H. bouvieri* (KIRKALDY, 1904), and in all species known from Sulawesi, all species from the Philippines including *H. balnearius* (BERGROTH, 1918) and a number of undescribed species, *H. corporaali* (CHINA, 1930) from Sumatra, and several other species from Indonesia, Malaysia (including Borneo) and Thailand. But the presence of a group of undescribed species of *Hydrotrephes* s.l. with elongate right parameres may undermine the reliability of this character. Further, the mesosternal carina is always obtuse posteriorly in *Helotrephes*, whereas in typical *Hydrotrephes* species there is a median laminate part; unfortunately this character has also been found to be inconsistent over all *Hydrotrephes* s.l. species now known.

In this paper the genus *Helotrephes* is divided into five species groups, each based on apomorphic characters, and considered to be monophyletic. A similar analysis for *Hydrotrephes* s.l. should clarify the relationships between species groups in that genus as well, and reveal whether *Helotrephes* and *Hydrotrephes* in the present sense are monophyletic, paraphyletic, or even polyphyletic entities.

Until now five species taxa of *Helotrephes* have been described; one of them, *H. lundbladi* CHINA, 1935, is a synonym of *H. semiglobosus* STÅL, 1860. Three species are reported from the mainland of China (ZETTEL 1995), and one from Taiwan, which is here ranked as a subspecies of *H. semiglobosus*. Surprisingly three new species have been discovered on Java and Borneo, two of them described here, and the third one described by NIESER & CHEN (in press). The genus *Helotrephes* was formerly thought to be restricted to the Asian mainland and Taiwan, and these are the first species known from the Malay Archipelago. This paper also considerably widens the known distribution of the genus in Asia, as it is now known from nearly the entire Southeast Asian mainland southward into peninsular Malaysia.

## Material

In the course of this study, more than 300 *Helotrephes* specimens were examined. Imagines were mostly dried and pinned, only some specimens were kept in alcohol. However, larvae were mostly kept in alcohol. As often different *Helotrephes* species

occur intermixed, and larvae are presently not identifiable with certainty, they were not mentioned in the "material" sections. Specimens are deposited in the following institutions and private collections:

### Repositories:

|      |  |
|------|--|
| BMNH | The Natural History Museum [formerly British Museum of Natural History],<br>London, United Kingdom |
| CASS | Chinese Academy of Sciences, Institute of Applied Ecology, Shenyang, China                         |
| CSS  | Coll. W.D. Shepard, California State University, Sacramento, U.S.A.                                |
| CMUT | Chiang Mai University, Faculty of Sciences, Department of Biology, Chiang Mai, Thailand            |
| CNT  | Coll. N. Nieser, Tiel, The Netherlands   |
| CPC  | Coll. P.P. Chen, Beijing, China  |
| JTPC | Coll. J.T. Polhemus, Englewood, Colorado, U.S.A.   |
| KKUA | Khon Kaen University, Faculty of Agriculture, Department of Entomology, Khon Kaen, Thailand        |
| KKUB | Khon Kaen University, Faculty of Sciences, Department of Biology, Khon Kaen, Thailand              |
| NHMW | Naturhistorisches Museum in Wien, Vienna, Austria  |
| RMNH | National Museum of Natural History, Leiden, The Netherlands  |
| UBCB | Coll. M. Papáček, University of South Bohemia, České Budejovice, Czech Republic                    |
| UMRM | W.R. Enns Entomology Museum, University of Missouri, Columbia, U.S.A.                              |
| UMS  | Universiti Malaysia Sabah, Kota Kinabalu, Malaysia   |
| ZSMG | Zoologische Staatssammlung München, Munich, Germany  |

Specimens are brachypterous (with shortened hind wings) if not otherwise stated. Macropterous forms are generally rare and only known in four species (*H. shepardi* sp.n., *H. sausai*, *H. australis* sp.n., and *H. nieserianus* sp.n.).

### Measurements and figures

**Measurements:** all measurements are in millimetres. For the ranges of body length and width (maximum width across base of cephalonotum) at least five specimens of each sex were measured, or all specimens available. Other measurements refer to the holotype.

**Figures:** the structures of male genitalia are most essential for the identification of species. Attaining the same orientation of these structures is very important for comparison. All figures of aedeagi and parameres are in the morphologically right view. The small figures inserted, which show the apex of the male genitalia, are in same magnification and orientated in the following way: the apex of the aedeagus is shown in the view of the axis of the aedeagus, or, if a completely delimited apical plate is present, the apical plate is shown in full view. Apex of parameres are shown in the (dorso-external) full view of the most apical part.

The female subgenital plate (sternite 7) was dissected from the abdomen for drawing as its base is covered by the sternite 6; drawings are made in the ventral (external) view; only hairs surpassing the posterior margin (which are of taxonomical importance) are

drawn. Pronotal and genal plates are depicted in a ventrolateral view, giving a full view of the pronotal notch. Sternal carinae are drawn ventral side up; abbreviations: pr - pro-sternal carina; ms - mesosternal carina; mt - metasternal carina; 2, 3, 4, 5, 6 - carinae of sternites 2 - 6.

### *Helotrephes* STÅL, 1860

*Helotrephes* STÅL, 1860: 267.

*Helotrephes*: ESAKI & CHINA 1927: 280 (partim) - ESAKI & CHINA 1928: 133 (partim) - CHINA 1932: 270 (partim) - CHINA 1935: 595 - MIYAMOTO 1952: 1 - STYS & JANSSON 1988: 13 - POLHEMUS 1990: 54, 60 - ZETTEL 1994: 291 - ZETTEL 1997a: figs. 21, 22.

**Type species:** *Helotrephes semiglobosus* STÅL, 1860 (by monotypy).

**Description:** middle sized to large Helotrephini, body length 2.2 - 3.7 mm, body strongly convex. Head totally fused with the pronotum, dorsal suture weak, at most partly visible. Eye dorsal of the continuous lateral margin of the cephalonotum; eye in macropterous form only slightly larger than in brachypterous form. Antenna two-segmented. Rostral segments 1 and 2 extremely short, fourth segment 1.6 - 2.6 times as long as segment 3. Pronotal plate with incision at eye level. Propleural plate not fused with pronotal plate, not in the same level. Mesosternal carina obtuse posteriorly. Hemelytron opaque, faintly rugulose, set with alveoli each bearing a slender seta; distal locking tab (pseudomembrane) on right hemelytron; base of clavus with denticulate area (see ZETTEL 1997a: figs. 21, 22); costal margin with a row of numerous fine ridges (stridulation; discussed by POLHEMUS 1990). Hemelytron of macropterous morph with separated embolium and clavus; claval suture pointing at posterior third of mesoscutellum. Hind wing with reduced venation (see e.g. MAHNER 1993: fig. 21D; after ESAKI & CHINA 1928), in brachypterous form reduced to small membranous strips. All femora with pectinate bristles beneath, longer basally. Tarsal formula 1-1-2. Claws of each leg about half as long as distal tarsal segment. Ventral carinae reaching onto abdominal segment 5 (in some females) or segment 6 (in males and in some females).

Male: genital segments modified, twisted strongly to the left. Genital capsule elongate. Aedeagus long, cylindrical, usually with modified apex: often with an apical plate laying dorsally on the apex and completely separated by a carina (large in the *H. sausai* group, small in the *H. semiglobosus* group and in *H. flaviceps*); or with a lamina, which extends from the medio-posterior surface of the aedeagus (in most species of the *H. otoe*is - and *H. australis* group); rarely unmodified, with simple tip (in the *H. jendeki* group). Right paramere long, slender, more or less curved, usually twisted on distal half, with tapered, enlarged, hooked, or otherwise modified apex. Left paramere rather uniform: long, tapering toward apex, on basal half with a more or less developed mediad directed lobe (which, in situ, surrounds the aedeagus), in some species with an apical hook.

Female: abdominal segments symmetrical. Sternites 5 and 6 more or less fused; sternite 6 often with convex or angulate hind margin, more or less covering the base of sternite 7 in ventral view. Subgenital plate (sternite 7) sculptured distally, of varying shape, but in most species with a distinct median lobe at hind margin.

**Distribution:** East-Oriental, limited by Wallace's Line to the East (for details see chapter "Distribution of species groups" after the taxonomic part).

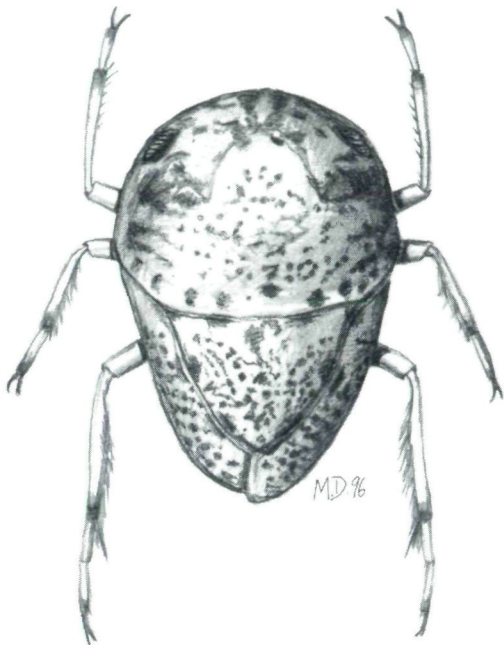


Fig. 1: Habitus of *Helotrephes australis* sp.n.

**Habitats:** *Helotrephes* species inhabit running waters, however, they are found only in lentic or slow-lotic areas. Most specimens treated in this study were found along the edge of small and middle sized streams, preferably where the banks are shaded and some roots of trees are hanging into the water. Some specimens - e.g. of *H. otoeis*; description of habitat in ZETTEL (1997b) - were collected in inlets with large, floating accumulations of plant debris (including twigs, where they probably rest on). Some species live intermixed with *Hydrotrephes* species, which have usually similar habitat requirements.

**Biology:** The biology of *H. semiglobosus formosanus* (stat.n.) was described in detail by MIYAMOTO (1952).

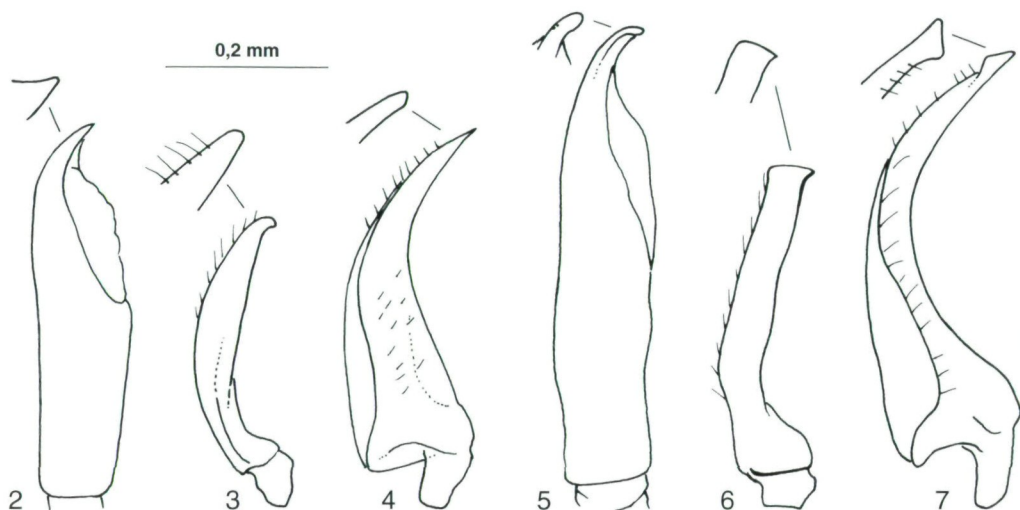
**Species discrimination:** Mainly, the same characters are useful as in *Hydrotrephes* species, recently listed by POLHEMUS (1997). Male genitalia (aedeagus, both parameres) and female subgenital plates are very constant and therefore most reliable for identification of species. The incision of the pronotal plate of *Helotrephes* species seems to be more constant than in *Hydrotrephes*, only in species of the *H. semiglobosus* group intraspecific variations were observed. Striking differences in the overall size of sympatric specimens of one species (as in *Hydrotrephes nieseri* POLHEMUS, 1997) could not be found in *Helotrephes* species.

Identification key to species and subspecies

- 1    Hind margin of pronotum without tubercles. .... 2
- Hind margin of pronotum laterally with prominent tubercles (Figs. 96 - 98, 102) (*H. otoeis* group). .... 12
- 2    Prosternal carina without emargination, obtusely or acutely angulated (Figs. 15, 16, 34, 35). .... 3
- Prosternal carina in posterior part with distinct emargination (Figs. 49, 50, 66 - 68). .... 8
- 3    Head finely punctate, shining, medially with a large black mark (Figs. 10, 11); aedeagus without apical plate (Figs. 2, 5) (*H. jendeki* group). .... 4
- Head at least anteriorly densely punctate and mat, medially with scattered dark marks (Fig. 29); aedeagus with apical plate (Figs. 17, 20, 23, 26) (*H. semiglobosus* group). .... 5

- 4 Distance between alveoli on hemelytron smaller than their diameters (Fig. 9); metasternal carina much higher than carina on sternite 2 (Fig. 16); median dark mark of head interrupted (Fig. 11); both parameres apically truncate (Figs. 6, 7) (Thailand: Chiang Mai). ..... *H. porntipae* sp.n.
- Distance between alveoli on hemelytron (except on base) on average larger than their diameters (Fig. 8); metasternal carina only slightly higher than carina on sternite 2 (Fig. 15); dark mark reaching anterior margin of head (Fig. 10); right paramere apically rounded (Fig. 3), left paramere apically acute (Fig. 4) (China: Jiangxi). ..... *H. jendeki*
- 5 Left paramere of male at most with a weak apical hook (Fig. 28); hind margin of female subgenital plate medially obtusely produced (Fig. 39); pronotal plate with a small incision (Fig. 33); body length 2.8 - 3.4 mm (Thailand: Chiang Mai, Phetchabun; Viet Nam: Vinh Phu). ..... *H. shepardi* sp.n.
- Left paramere with a distinct apical hook (Figs. 19, 22, 25); female subgenital plate with a well defined middle lobe (Figs. 36 - 38); pronotal plate often with a deep incision (Figs. 30 - 32); body length 2.5 - 2.8 mm, but up to 3.2 mm in specimens from Hainan Island (*H. semiglobosus*). ..... 6
- 6 Body length 2.9 - 3.2 mm; incision of pronotal plate usually small (Fig. 32); right paramere distally strongly tapered, with very slender apex (Fig. 24); female subgenital plate relatively wide (Fig. 38) (China: Hainan). ..... *H. semiglobosus hainanicus* ssp.n.
- Body length 2.5 - 2.8 mm; incision of pronotal plate large (Figs. 30, 31); right paramere distally different (Figs. 18, 21); female subgenital plate relatively narrow (Figs. 36, 37) ..... 7
- 7 Right paramere distally slender (Fig. 18); female subgenital plate with middle lobe basally less graded ventrad (in lateral view), and lateral lobes less covered by the middle lobe (Fig. 36) (China: Sichuan, Anhui, Zhejiang, Jiangxi, Fujian, Guangdong, Hong Kong, Guangxi). ..... *H. semiglobosus semiglobosus*
- Right paramere distally broad (Fig. 21); female subgenital plate with middle lobe basally more graded ventrad and lateral lobes more covered by the middle lobe (Fig. 37) (Taiwan). ..... *H. semiglobosus formosanus*
- 8 Large species with body length 3.4 - 3.6 mm; prosternal keel in anterior part with a rounded lobe (Figs. 49, 50); cephalonotum shining; aedeagus with large apical plate (Figs. 40, 43) (*H. sausai* group). ..... 9
- Smaller species with body length 2.4 - 2.8 mm; prosternal keel in anterior part with an acute tip (Figs. 66 - 68); cephalonotum more or less mat; aedeagus without apical plate (Figs. 54, 57, 60) (*H. australis* group). ..... 10
- 9 Incision of pronotal plate shallow and wide (Fig. 47); hemelytron with small alveoli, their diameters less than 2 times larger than of alveoli on pronotum; head mainly blackish with yellowish median stripe (Fig. 46); male genitalia as in Figures 40 - 42; female subgenital plate with short, broad distal lobe (Fig. 51) (China: Yunnan). ..... *H. sausai*
- Incision of pronotal plate narrow and deep (Fig. 48); hemelytra with large alveoli, their diameters about 3 times larger than of alveoli on pronotum; head with several small brownish dots on yellowish ground; male genitalia as in Figures 43 - 45; female subgenital plate with elongate, narrow, tongue-shaped middle lobe (Fig. 52) (Thailand: Chiang Mai). ..... *H. major* sp.n.

- See also *Helotrephes* sp. (♀) from Laos (Luang Nam Tha) with long, but broad middle lobe of female subgenital plate (Fig. 53); other characters as in *H. major* sp.n.
- 10 Incision of pronotal plate at inner margin wide (Fig. 64); keel of sternite 3 with conspicuous long hairs (Fig. 67); aedeagus apically with upright lamina (Fig. 57); middle lobe of female subgenital plate posteriorly truncate (Fig. 70) (Thailand: Phetchabun, Chiang Mai). ..... *H. incisus* sp.n.
- Incision of pronotal plate at inner margin constricted (Fig. 63, 65); keel of sternite 3 without or with short, inconspicuous hairs (Figs. 66, 68); apex of aedeagus very different (Figs. 54, 60). ..... 11
- 11 Cephalonotum yellowish with numerous small brownish spots (Fig. 1); prosternal carina with spinose, postero-ventrad directed angle (Fig. 66); aedeagus apically acute (Fig. 54); both parameres apically slender (Figs. 55, 56); middle lobe of female subgenital plate posteriorly convex (Fig. 69) (Thailand, Laos, peninsular Malaysia). ..... *H. australis* sp.n.
- Cephalonotum darker, head with a medial dark area reaching anterior margin; prosternal carina with less acute, posteriad directed angle (Fig. 68); aedeagus with oblique lamina (Fig. 54); both parameres apically broad (Figs. 61, 62); middle lobe of female subgenital plate posteriorly truncate (Fig. 71) (Thailand: Mae Hong Son, Chiang Mai; Laos: Luang Nam Tha). ..... *H. nieserianus* sp.n.
- 12 Hind margin of pronotum mediolaterally with distinct, shining swellings (Fig. 96); head bright yellow, without dark marks in posterior part; aedeagus with a small, but completely demarcated apical plate (Fig. 84); female subgenital plate with relatively long and stalked median lobe, and with several hairs laterally of the lobe (Fig. 107) (Thailand: Mae Hong Son, Songkhla, Yala). ..... *H. flaviceps* sp.n.
- Hind margin of pronotum mediolaterally without (Figs. 97, 98) or, rarely (in some specimens of *H. tuberculatus* sp.n. and *H. kodadai* sp.n.), with a very weak swelling; head with more or less extended dark marks in posterior part (e.g. Fig. 102); aedeagus without apical plate, but usually with an oblique, plate-like lamina, which is never completely demarcated (Figs. 72, 75, 78, 81, 87); female subgenital plate different (Figs. 103 - 106) (note, also for following couplets, that the female of *H. affinis* sp.n. is unknown). ..... 13
- 13 Right paramere apically very slender, the apex hook-like, not distinctly enlarged (Fig. 82); female subgenital plate with very short, truncate median lobe, without hairs laterally of the lobe (Fig. 106) (Thailand: Phetchabun; China: Hainan). ..... *H. tuberculatus* sp.n.
- Right paramere with distinctly (rarely weakly) enlarged apex (Figs. 73, 76, 79, 88); female subgenital plate with some hairs laterally of median lobe (Figs. 103 - 105) .... 14
- 14 Right paramere distally narrow (Figs. 76, 79); median lobe of female subgenital plate short (Figs. 104, 105) ..... 15
- Right paramere distally relatively broad (Figs. 73, 88); female subgenital plate with rounded, stalked median lobe (Fig. 103), or unknown. .... 16
- 15 Tubercles of cephalonotum weakly developed (Fig. 98); apex of right paramere weakly, nearly symmetrically expanded, spatulate (Fig. 79); hind margin of female sternite 6 medially forming an obtuse angle, without narrow tuft of hairs (Indonesia: Java) ..... *H. javanicus* sp.n.



Figs. 2 - 7: *Helotrephes jendeki* group: male genitalia of (2 - 4) *H. jendeki* and (5 - 7) *H. porntipae* sp.n.; (2, 5) aedeagus, (3, 6) right paramere, (4, 7) left paramere.

- Tubercles of cephalonotum strongly developed (comp. Fig. 97); apex of right paramere asymmetrically expanded, not spatulate (Fig. 76); hind margin of female sternite 6 medially forming a nearly right angle, with a narrow tuft of hairs (Malaysia: Sarawak) ..... *H. kodadai* sp.n.
- 16 Pronotal plate with a nearly rectangular incision (Fig. 90); aedeagus apically narrowly rounded (Fig. 72); female subgenital plate with rounded, stalked median process (Fig. 103) (Malaysia: Sabah). ..... *H. otoeis* NIESER & CHEN (in press)
- Pronotal plate with a narrow notch (Fig. 95); aedeagus apically truncate (Fig. 72); female unknown (Thailand: Songkhla). ..... *H. affinis* sp.n.

### Phylogeny of species groups

As already discussed, the relationships of *Helotrephes* to other Helotrephini genera is not yet clearly understood. If the presence of a ventral keel on abdominal sternites 4 - 6 (sometimes reduced in females on sternite 6) is regarded as a synapomorphy for *Helotrephes* species, with *Hydrotrepes* as a possible adelphotaxon, the following considerations for the phylogeny of *Helotrephes* species groups may serve as a basis for further discussion:

Three species groups (*H. otoeis* -, *H. sausiai* -, *H. australis* group) have a concave hind margin of the prosternal keel, a character so far not described from other Helotrephidae, and for this reason a possible synapomorphy. Each of these groups are well defined from each other, but so far no logical synapomorphy of two groups has been found.

The other two species groups are probably more basic. The *H. jendeki* group is mainly characterized by plesiomorphic characters, and seems to be most ancestral. The *H. semiglobosus* group shares an apical plate of the aedeagus with the *H. sausiai* group and *H.*

*flaviceps* of the *H. otoe* group. This character may be reduced in other species of the *H. otoe* - and *H. australis* group; in this case the *H. semiglobosus* group is a possible adelpho-"taxon" of the *H. otoe* + *sausai* + *australis* groups.

Apomorphic characters of the species groups are marked with an asterisk (\*) in the species group diagnosis.

## Description of species and subspecies

### The *Helotrephes jendeki* group

**Diagnosis:** Small to medium sized species, body length 2.4 - 2.9 mm. Colouration relatively dark, with blackish median stripe or mark on head\*. Cephalonotum with medium sized, but scattered punctation, at least partly shining; hind margin of cephalonotum laterally without tubercles. Pronotal plate with shallow incision, posteriorly not dilated, with convergent sides. Prosternal carina without incision posteriorly. Male genitalia very characteristic: aedeagus with simple apex (\*?), without apical plate; right paramere parallel-sided or lanceolate, apically straight or slightly right-bent, shorter than left paramere\*; left paramere strongly bowed (\*?, also in *H. sausai* in the *H. sausai* group), proximally broad, in distal part strongly tapered, with or without apical hook. Female (unknown in *H. porntipae* sp.n.) with straight hind margin of sternite 6. Female subgenital plate with short, broad middle lobe.

The group contains two species, one from China (Jiangxi) and one from North Thailand.

### *Helotrephes jendeki* ZETTEL, 1995 (Figs. 2 - 4, 8, 10, 12, 13, 15)

*Helotrephes jendeki* ZETTEL, 1995: 293.

**Material examined:** holotype (♂): "CHINA Jiangxi W\ JINGGANG SHAN\ Ciping env.\ 2-14.VI.1994" (NHMW) and 42 paratypes with same locality data (CPC, CASS, CNT, JTPC, NHMW, UBCB).

**Description:** see ZETTEL (1995).

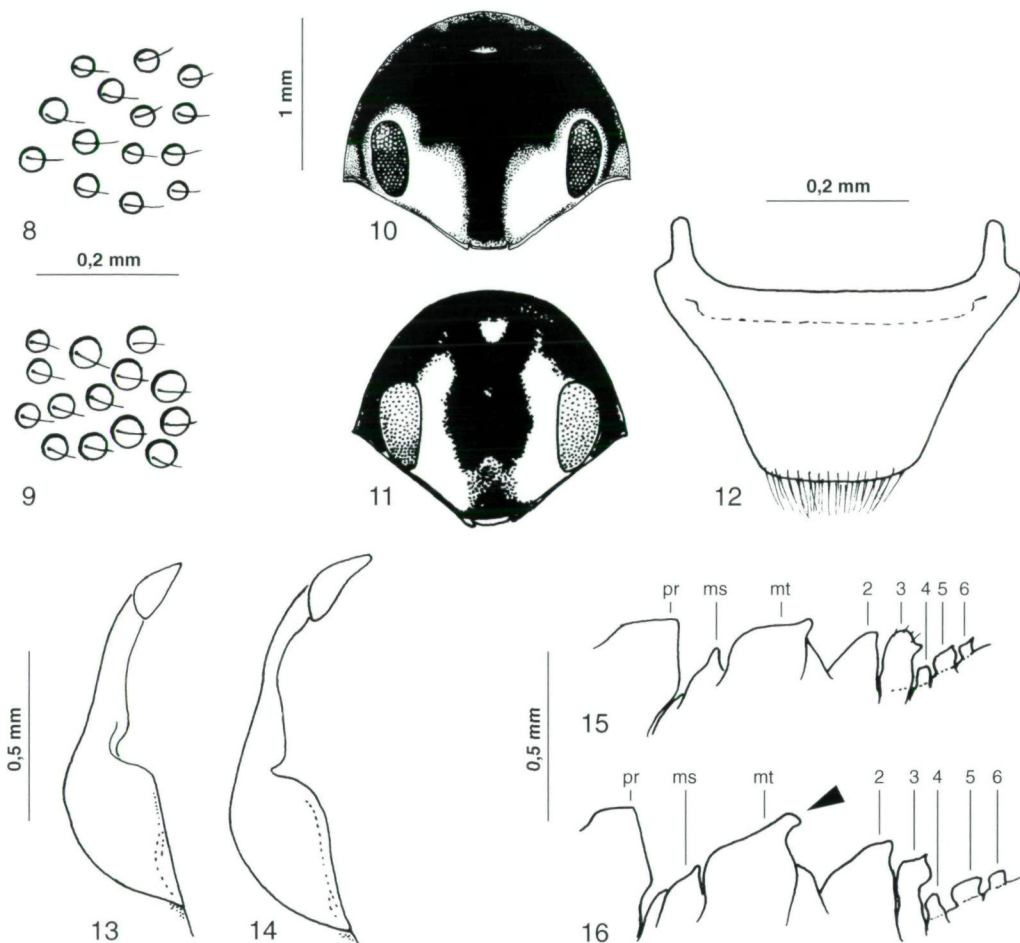
**Diagnosis** (see also species group characters): Body length 2.42 - 2.57 mm, width 1.83 - 1.95 mm. Ground colour blackish brown, head with large yellowish marks around eyes, with black median stripe reaching anterior margin (Fig. 10). Cephalonotum finely and sparsely punctate, between punctures shining. Pronotal plate with a wide, shallow incision, acute in posterior corner (Fig. 13). Propleural plate weakly truncate. Hemelytron with large, but spaced alveoli (Fig. 8). Sternal carina strongly developed; prosternal carina posteriorly rectangular; sternite 6 with well developed carina in both sexes (Fig. 15).

Male: aedeagus with simple apex (Fig. 2). Right paramere shorter than left paramere, slender lanceolate with narrowly rounded apex (Fig. 3). Left paramere distally bent, with acute apex (Fig. 4).

Female: subgenital plate with short, tongue-like shaped distal part (Fig. 12).

**Comparative notes:** see group characters and comparative notes under *H. porntipae* sp.n.

**Distribution:** China (Jiangxi).



Figs. 8 - 16: *Helotrephes jendeki* group: (8, 9) alveoli in lateral area of hemelytron of (8) *H. jendeki* and (9) *H. porntipae* sp.n.; (10, 11) cephalonotum, frontal view of (10) *H. jendeki* (from ZETTEL 1995) and (11) *H. porntipae* sp.n.; (12) female subgenital plate of *H. jendeki*; (13, 14) pronotal and genal plate, ventro-lateral view, of (13) *H. jendeki* and (14) *H. porntipae* sp.n.; (15, 16) sternal carinae (venter turned upward) of (15) *H. jendeki*, ♂, and (16) *H. porntipae* sp.n., ♂.

***Helotrephes porntipae* sp.n.** (Figs. 5 - 7, 9, 11, 14, 16)

**Holotype** (♂): "Thailand: Chiang Mai\ Doi Suthep\ 27.12.1989\ l.Porntip Chantaramongkol" (NHMW).

**Description** (see also species group characters): Body size, brachypterous form: length 2.89 mm, width 2.08 mm. Ground colour yellowish brown, extensively marked with brown. Cephalonotum with a median dark brown region, extending narrowly anterad, divided posteriorly (Fig. 11); anterior extreme mostly yellowish, remainder of cephalonotum, hemelytra, mesoscutellum with an extensive pattern of deep brown irregular, reticulated markings, punctations appearing light or dark. Base of mesoscutellum with a transverse

deep brown stripe. Venter mostly brown. Legs and antennae yellowish, legs slightly darker distally, rostrum light brown.

Cephalonotum shining, convex, set with small alveoli, in dorsal view (of entire insect) much broader than long (2.08 : 1.00) lateral margins carinate. Pronotal plate with a rather shallow, angular notch (Fig. 14). Mesopleural and propleural plates not notched. Eye broad, length : width, 0.65 : 0.42. Interocular distance 1.07. Lengths of rostral segments 3 and 4: 0.19, 0.47.

Mesoscutellum weakly shining, set with tiny depressed alveoli, each with one long slender seta, each surrounded by a roughly circular transparent region; length : width, 1.20 : 1.23.

Hemelytra opaque, faintly shining, alveoli very large, dark, depressed, each with a long slender seta (Fig. 9). Ventral carinae prominent; prosternal carina with obtuse tip, slightly indented but not emarginate posteriorly; metasternal carina with a prominent, postero-ventrad directed process (Fig. 16).

Male: aedeagus with gently curved, slightly produced apex (Fig. 5). Right paramere shorter than left paramere, parallel-sided, apically truncate (Fig. 6). Left paramere strongly, evenly curved, apically angularly extended (Fig. 7).

Female unknown.

**Comparative notes:** *Helotrephes porntipae* sp.n. differs externally from *H. jendeki* by larger size, less dark colouration (head: Fig. 11), narrower incision of the pronotal plate (Fig. 14), and differently shaped ventral carinae, especially by a posteroventrad directed process on the metasternal carina (Fig. 16). Further, the male of *H. porntipae* sp.n. is clearly differentiated by the apically truncate right paramere (Fig. 6) and the apically extended left paramere (Fig. 7). *Helotrephes porntipae* sp.n. differs from all other species by the extremely coarse sculpturation (with very large alveoli) of the hemelytron (Fig. 9).

**Distribution:** Thailand (Chiang Mai).

**Etymology:** Named after Prof. Dr. Porntip Chantaramongkol (Chiang Mai), expert on Trichoptera, who collected this rare species in a well-known locality. The first author is especially indebted to her for the permission to deposit the holotype in the collection of the NHMW.

### **The *Helotrephes semiglobosus* group**

**Diagnosis:** Small to large species, body length 2.5 - 3.3 mm. Colouration variable. Cephalonotum with rather fine, but dense punctation, usually mat, without tubercles laterally on hind margin of cephalonotum. Pronotal plate posteriorly not dilated, with convergent sides. Prosternal carina angular posteriorly, not emarginate. Male genitalia very characteristic: aedeagus preapically narrowed, with apical plate; right paramere slender-lanceolate, with apex bent to left\*; left paramere slender, with apical posteriorly directed hook\* (reduced in *H. shepardi* sp.n.), with posterior lobe weakly developed, restricted to basal third. Female with broadly convex hind margin of sternite 6. Female subgenital plate with roundish, not stalked middle lobe, or medially with indistinct lobe and triangularly produced in middle of hind margin.

The group contains the widely distributed *H. semiglobosus* with three subspecies from China including Taiwan and Hainan, and the allopatric but more differentiated *H. shepardi* sp.n. from North Thailand and North Vietnam.

***Helotrephes semiglobosus semiglobosus* STÅL, 1860** (Figs. 17 - 19, 29, 30, 36)

*Helotrephes semiglobosus* STÅL, 1860: 268. - POLHEMUS 1990: 54 (partim). - ZETTEL 1995: 295.

*Helotrephes lundbladi* CHINA, 1935: 599 (syn. by POLHEMUS 1990).

**Material examined:** holotype (♂) of *Helotrephes lundbladi* "Type", "China\ 92-196.", "7785", "*Helotrephes lundbladi* China\ TYPE\ det. W.E.China. 1934" (BMNH); **further material:** 2 ♂♂, 1 ♀ "HONGKONG (7) 1992\ N.T.- Tai Po N.Res.\ 27.VI. leg. Jäch" (NHMW); 1 ♂ "CHINA:Guangxi, 10 km NE\ Liuzhou,2km E Shanmenjiang\ Forest Farm,150m,10.11.1993, leg.Schönmann (17)" (NHMW); 4 ♂♂, 6 ♀♀ "Hong Kong, New Territories\ upper Lam Tseun River\ CL 2210, 23.XI.1985\ J.T. & D.A. Polhemus" (JTPC); 1 ♀ "CHINA: Guangxi, Bez. Liuzhou\ Shanmenjiang Forest Farm\ 10 km NE Liuzhou\ 10.11.1993, 200 m\ leg. H. Schillhammer (17)" (NHMW); 1 ♂, 1 ♀ "CHINA: SE Guangxi, Yulin\ Liuwan Forest Farm\ 350-400 m, 16.11.1993, leg. Schönmann (20)" (NHMW); 1 ♀ "CHINA: SE Guangxi, Yulin\ Liuwan Forest Farm\ 600-700 m, 17.11.1993, leg. Schillhammer (21)" (NHMW); 1 ♂ "CHINA: SE Guangxi, Yulin\ Liuwan Forest Farm\ 500 m, 20.11.1993, leg. Schillhammer (26)" (NHMW); 1 ♀ "CHINA: Jiangxi W\ JINGGANG SHAN\ Ciping env.\ 2.-14.VI.1994" (NHMW); 1 ♂, 1 ♀ "China: Jiangxi Province\ Namchang, Agric. Univ.\ Meiling River\ VII-X, 1995\ leg. Xue Fang-Sen", "CH-X95-He 1[2]\ coll. Kallenborn\ Universität des\ Saarlandes, Saar-\ brücken, Germany" (JTPC); 1 ♂ "CHINA: Sichuan, 9.6.1996\ ca. 16 km N Ya'an City\ 2 km NW Shangli, 950m\ leg. Ji & Wang (CWBS 226)" (NHMW); 1 ♀ "CHINA: Sichuan, 6.6.1996\ ca. 14 km N Ya'an City\ rd. to Shangli, 800m\ leg. Ji & Wang (CWBS 221)" (NHMW); 1 ♀ "CHINA: FUJIAN, Guangze\ Wuyi Shan, 12 km S Zhima\ Li Fang, 400m, 22.1.1997\ leg. Ji & Wang (CWBS 252)" (NHMW); 2 ♀♀ "CHINA: FUJIAN, Yong'an\ 3 km SW Xiyang, 450m\ Ziyungdong Shan, 24.1.1997\ leg. Ji & Wang (CWBS 253)" (NHMW); 1 ♂ "CHINA: FUJIAN, Yong'an\ 2 km SW Xiyang, 350m\ Ziyungdong Shan, 24.1.1997\ leg. Ji & Wang (CWBS 254)" (NHMW); 1 ♂ "CHINA: FUJIAN, Chong'an\ Wuyi Shan, 2 km W Da'an\ 450m, 19.1.1997\ leg. Ji & Wang (CWBS 249)" (NHMW); 1 ♂, 2 ♀♀ "CHINA: FUJIAN, Chong'an\ Wuyi Shan, 3 km W Wuyi Gong\ 400m, 18.1.1997\ leg. Ji & Wang (CWBS 248)" (NHMW); 16 ex. (♂♂ and ♀♀) "CHINA: FUJIAN, Chong'an\ Wuyi Shan, 1 km W Wuyi Gong\ 250m, 15/16.1997\ leg. Ji & Wang (CWBS 240)" (CASS, NHMW, UBCB); 1 ♂ "CHINA: Anhui, Dabie Shan\ 40km N Yuexi, 5.11.1997\ env. Gui Xing Di, 800m\ leg. M. Wang (CWBS 295).

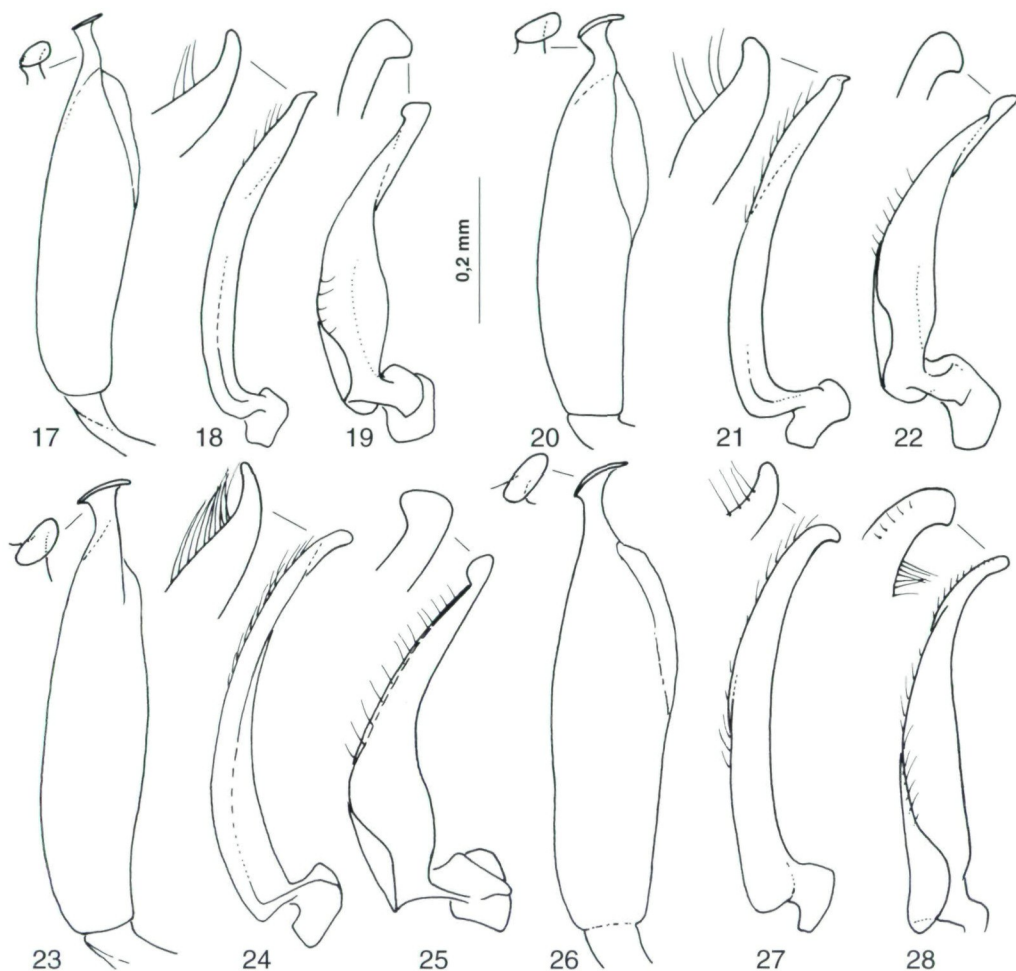
**Description:** see CHINA (1935); see also species group characters.

**Diagnosis of subspecies:** Body size, brachypterous form: length 2.49 - 2.80 mm, width 1.77 - 2.04 mm. Ground colour yellowish, on cephalonotum with small dark marks of variable extent (Figure 29 shows a very light specimen). Pronotal plate with deep and wide incision (Fig. 30). Prosternal carina posteriorly rectangular, all carinae similar to Figures 34 and 35 (see ZETTEL 1995: fig. 5); carina at base of female sternite 6 present, but usually very inconspicuous.

Male: aedeagus in lateral view apically moderately broad (see ZETTEL 1995: fig. 9) or narrow (Fig. 17), with roundish apical plate. Right paramere distally twisted, apically evenly tapered, weakly curved (Fig. 18). Left paramere distally twisted, with pronounced apical hook (Fig. 19). Male genitalia vary slightly within the large distribution area.

Female subgenital plate with well defined median lobe which is situated ventral of two short lateral lobes (Fig. 36).

**Comparative notes:** The nominate subspecies is distinctly smaller and has a wider incision of the pronotal plate than *hainanicus* ssp.n. and *H. shepardi* sp.n.; and can be distinguished from ssp. *formosanus* (from Taiwan) by small differences in male genitalia and female subgenital plate. For more differences see the notes under the other subspecies and *H. shepardi* sp.n.



Figs. 17 - 28: *Helotrephes semiglobosus* group: male genitalia of (17 - 19) *H. semiglobosus semiglobosus*, (20 - 22) *H. semiglobosus formosanus*, (23 - 25) *H. semiglobosus hainanicus* ssp.n., and (26 - 28) *H. shepardii* sp.n. (specimen from Thailand); (17, 20, 23, 26) aedeagus, (18, 21, 24, 27) right paramere, (19, 22, 25, 28) left paramere.

**Distribution:** mainland China (Sichuan, Anhui, Zhejiang, Jiangxi, Fujian, Guangdong, Hong Kong, Guangxi).

***Helotrephes semiglobosus* ssp. *formosanus* ESAKI & MIYAMOTO, 1943, stat.n.**  
(Figs. 20 - 22, 31, 37)

*Helotrephes formosanus* ESAKI & MIYAMOTO, 1943: 485. - POLHEMUS 1990: 60. - ZETTEL 1995: 291.

**Material examined: paratypes:** 3 ♂♂, 1 ♀ "Anko\ TAINOKU\ FORMOSA\ 25.V.1941\ COL. S. MIYAMOTO", "Paratypus\ *Helotrephes\ formosanus\* Esaki et Miyamoto\ 1943", "Brit. Mus.\ 1953-29" (BMNH); 1 ♂, 1 ♀ "Anko\ FORMOSA\ 16.II.1941\ COL. S. MIYAMOTO" (JTPC); **further material:** 2 ♀♀

"Taiwan: Taoyuan\ Fuhsing Gauyaw\ 18.IV.1995\ leg. L.J. Wang" (NHMW); 4 ♂♂, 3 ♀♀ "Taiwan: Taoyuan\ Gauyaw\ 22.VII.1995\ leg. L.J. Wang" (NHMW); 1 ♂, 1 ♀ "Yangming Park\ FORMOSA\ 16.II.1941\ COL. S. MIYAMOTO" (JTPC); 1 ♂, 1 ♀ "Taiwan, Yangming Park, Taipei Hsien\ 13.VII.1969\ Y. Hori leg." (JTPC).

**Description:** see ESAKI & MIYAMOTO (1943); see also species group characters.

**Diagnosis of subspecies:** Body size, brachypterous form: length 2.55 - 2.73 mm, width 1.89 - 2.03 mm. Ground colour yellowish, on cephalonotum with small dark marks of variable extension, usually light coloured. Pronotal plate with deep and wide incision (Fig. 31). Sternal carinae similar as in Figures 34 and 35; carina at base of female sternite 6 absent or very inconspicuous.

Male: aedeagus in lateral view apically narrow, with elongate apical plate (Fig. 20). Right paramere distally twisted, apically weakly tapered, curved (Fig. 21). Left paramere distally twisted, with obtuse apical hook (Fig. 22).

Female subgenital plate relatively narrow, with well defined median lobe; median lobe at base directed postero-ventrad, then bent posteriad, covering major parts of the two short lateral lobes (Fig. 37).

**Comparative notes:** Very similar to *H. semiglobosus* s.str. Only minute differences could be found in male genitalia: Tip of aedeagus constantly gracile (but this character varying in ssp. *semiglobosus*, see Fig. 17 of specimen from Fujian), its oblique plate narrower (Fig. 20); left paramere more twisted, its hook-shaped tip slightly more obtuse (Fig. 22); right paramere distally slightly more curved and broader (Fig. 21). The female subgenital plate is narrower, the lateral lobes more covered by the middle lobe, which is basally more graded (turned ventrad), but distally more flattened (Fig. 37). Female sternite 6 at most with inconspicuous anteromedian carina. There are no constant differences in colour, sternal carinae, or pronotal plate. Differences are too small to retain the specific rank of *formosanus*.

**Distribution:** Taiwan.

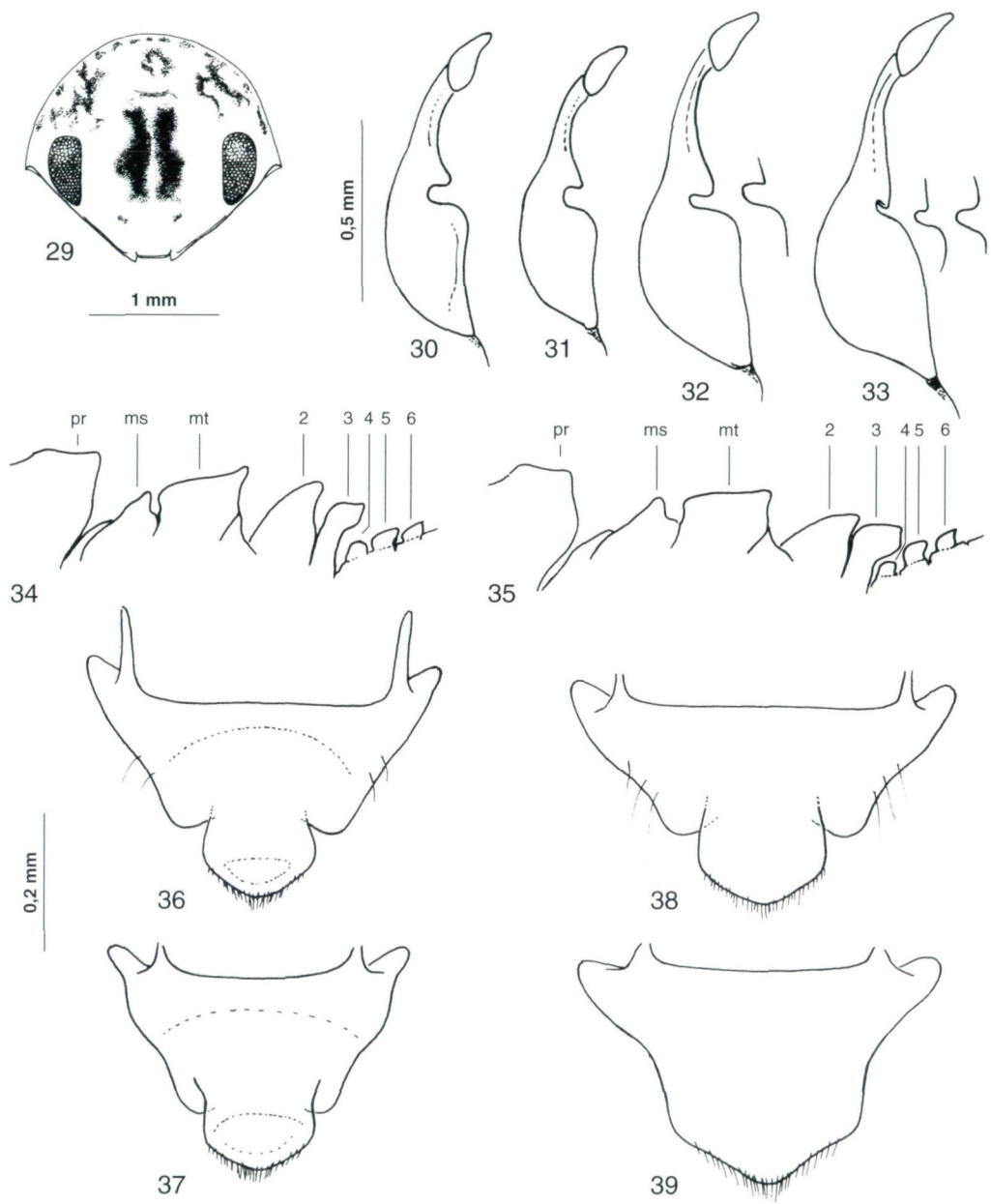
### *Helotrephes semiglobosus hainanicus* ssp.n. (Figs. 23 - 25, 32, 34, 38)

**Holotype** (♂): "CHINA: Hainan (204)\ 4km E Jianfeng, 150m\ Jianfeng Mt., 1996\ 22.\24.1., Ji & Wang" (NHMW); **paratypes:** 4 ♂♂, 4 ♀♀, same locality data (NHMW, CASS, CPC); 1 ♂, 3 ♀♀ "CHINA: Hainan (194)\ 30km E Maoyang, 18.1.\ Wuzhi Shan Resort 1996\ 700-800m, Ji & Wang" (NHMW, CASS); 4 ♂♂, 6 ♀♀ "CHINA: Hainan (194)\ 30km E Maoyang, 18.1.\ Wuzhi Shan Resort 1996\ 700-800m, leg. Jäch" (NHMW, CASS, JTPC); 1 ♀ "CHINA: Hainan (205)\ Jianfeng Mts., 800m\ 5km NE Tian Chi\ 22.1.1998, leg. Jäch" (NHMW); 1 ♂, 2 ♀♀ "CHINA: Hainan (188)\ 7km W Qiongzong\ Baihua Ling, 300m\ 16.1.1996, leg. Jäch" (NHMW).

**Description and comparative notes:** Very similar to the nominate subspecies and only differing in the following characters:

Body size larger, length 2.97 - 3.18 mm, width 2.28 - 2.41 mm. Colour pattern similar, but dark marks more extensive and general appearance therefore darker (but this character varies in *semiglobosus* s.str.). Incision of pronotal plate narrower (Fig. 32), but this character slightly variable.

Male: apical plate of the aedeagus more extended posteriad (Fig. 23). Right paramere of male with more tapered, very slender tip (Fig. 24).



Figs. 29 - 39: *Helotrephes semiglobosus* group: (29) cephalonotum, frontal view, of *H. semiglobosus semiglobosus* (from ZETTEL 1995); (30 - 33) pronotal and genal plate, ventro-lateral view, of (30) *H. semiglobosus semiglobosus*, (31) *H. semiglobosus formosanus*, (32) *H. semiglobosus hainanicus* ssp.n., and (33) *H. shepardi* sp.n.; (34, 35) sternal carinae (venter turned upward) of (34) *H. semiglobosus hainanicus* ssp.n., and (35) *H. shepardi* sp.n.; (36 - 39) female subgenital plate of (36) *H. semiglobosus semiglobosus*, (37) *H. semiglobosus formosanus*, (38) *H. semiglobosus hainanicus* ssp.n., and (39) *H. shepardi* sp.n.

Female: apical part of the subgenital plate broader and shorter (Fig. 38). Sternite 6 without or with indistinct antero-median carina.

No constant differences could be found in colour, sternal carinae (Fig. 34), or male left paramere (Fig. 25).

This most southern subspecies of *H. semiglobosus*, so far only known from Hainan Island, is clearly more distinctive than the subspecies *formosanus*. The large body size and the shape of the apical part of the right paramere are diagnostic and constant in different samplings from Hainan.

**Distribution:** China (Hainan).

**Etymology:** Named after the occurrence in Hainan Island, where it is probably endemic.

***Helotrephes shepardi* sp.n.** (Figs. 26 - 28, 33, 35, 39)

*Helotrephes lundbladi* CHINA, 1935: PAPACEK & al. 1988: 147.

*Helotrephes semiglobosus* STÅL, 1860: POLHEMUS 1990: 54 (partim) - PAPACEK & al. 1990: 108.

*Helotrephes* sp.: ZETTEL 1997a: figs. 21-22.

**Holotype** (♂): "Thailand: P[h]etchabun\ Phu Hin Rong Kla NP\ Waterwheel Falls, 27.III.1994, leg. W.D. Shepard (1047)" (NHMW); **paratypes**: 3 ♀♀ from the same locality (NHMW, CSS, JTPC); 1 ♀ "Thailand: Chiang Mai\ Doi Sut[h]ep NP, Montatharn\ Falls, 24.III.1994\ leg. W.D. Shepard (1044)" (NHMW); 2 ♀♀ macropterous, 1 ♂ "Thailand: Chiang Mai Prov.\ Doi Suthep NP, Montatharn\ Falls, 750-800m, 2.II.1995, leg. H. Zettel (4)" (NHMW); 1 ♀ "Thailand: Chiang Mai\ Doi Suthep\ 27.12.1989\ 1. Porntip Chantaramongkol" (CMUT); 1 ♂, 1 ♀ "Mt. Tam Dao\ N. Vietnam\ 26-IX-1994\ M. Satô leg." (JTPC); 3 ♂♂, 8 ♀♀ "Vietnam. Vinh Phu\ Tam Dao, 1200 m\ 8.4.78, M. Josifov" (ZSMG, JTPC, NHMW); 2 ♀♀, and 2 ♀♀ macropterous "S VIETNAM: Vinh Phu\ Tam Dao\ leg. Pacholatko\ & Dembicky" (NHMW).

**Field notes:** collected by the first author (site no. 4) along the edge of a middle sized river above a water fall in a forested area.

**Description** (see also species group characters): Body size, brachypterous form: length 2.84 - 3.34 mm, width 2.15 - 2.44 mm; macropterous form: length 2.66 - 3.35 mm, width 2.28 - 2.37 mm. Ground colour yellowish brown, extensively marked with brown. Cephalonotum with scattered dark markings between and behind eyes; anterior half mostly yellowish, remainder of cephalonotum and hemelytra with scattered deep brown irregular markings, punctations appearing light or dark. Mesoscutellum mostly yellowish brown, slightly darker basally and along distal margins; base with transverse orange brown stripe. Venter mostly yellowish brown. Legs and antennae yellowish, rostrum yellowish to light brown.

Cephalonotum shining, convex, set with small alveoli, in dorsal view (of entire insect) much broader than long (2.33 : 1.05) lateral margins carinate. Pronotal plate with a rather shallow, angular or rounded notch, somewhat variable (Fig. 33). Mesopleural and propleural plates not notched. Eye broad, length : width, 0.53 : 0.30 (0.67 : 0.38 in macropterous form). Interocular distance 1.19 (1.16 in macropterous form). Lengths of rostral segments 3 and 4: 0.19, 0.44.

Mesoscutellum weakly shining, set with tiny depressed alveoli, each with one long slender seta, each surrounded by a roughly circular transparent region; length: width, 1.58 : 1.58.

Hemelytra opaque, faintly shining, alveoli dark, depressed, each with a long slender seta. Ventral carinae prominent; prosternal carina with broadly rounded tip, posterior margin forming an obtuse triangle (Fig. 35).

Male: aedeagus with elongate apical plate (Fig. 26). Right paramere distally narrow, weakly tapered (Fig. 27). Left paramere without (in specimens from North Thailand; Fig. 28), or with inconspicuous (in specimens from North Vietnam) apical hook.

Female: subgenital plate distally broad, parallel-sided, hind margin forming an obtuse triangle (Fig. 39).

**Comparative notes and discussion:** *Helotrephes shepardi* sp.n. is closely related with *H. semiglobosus* and occurs allopatrically to the south and west of this species. Important differences in the male genitalia and the female subgenital plate justify the specific rank of this taxon. The main difference is found in the female subgenital plate of *H. shepardi* sp.n., which has a very different shape than that of *H. semiglobosus* (comp. Fig. 39 with Figs. 36 - 38). Further, males are distinguishable by the reduction of an apical hook on the left paramere in *H. shepardi* sp.n. (Fig. 28; difference less distinct in specimens from Vietnam), which is well developed in all subspecies of *H. semiglobosus* (Fig. 19, 22, 25). *Helotrephes shepardi* sp.n. has a smaller incision of the genal plate (slightly varying, see Fig. 33) and is distinctly larger than *H. semiglobosus*, except ssp. *hainanicus* ssp.n., which is of similar size.

*Helotrephes shepardi* sp.n. was misidentified as *H. semiglobosus* (or its synonym *H. lundbladi*) by former authors (PAPACEK & al. 1988, 1990, POLHEMUS 1990, partim).

**Distribution:** Thailand (Chiang Mai, Phetchabun), Vietnam (Vinh Phu).

**Etymology:** Named in honour of Prof. Dr. William D. Shepard, who provided us with numerous interesting Helotrephidae collected in Thailand and Malaysia.

### The *Helotrephes sausai* group

**Diagnosis:** large species, body length 3.4 - 3.6 mm (\*?). Colouration varying. Cephalonotum with fine punctuation, more or less shining; hind margin of cephalonotum without tubercles. Pronotal plate posteriorly not dilated, with convergent sides. Prosternal carina with a rounded lobe\* and a deep emargination posteriorly. Male genitalia: aedeagus with large, elongate apical plate; left paramere stout; right paramere stout\*. Female sternite 6 with straight hind margin. Female subgenital plate with a short or tongue-like, not stalked, middle lobe.

The group contains two species, *H. sausai* from South China (Yunnan) and *H. major* sp.n. from North Thailand. A single female from Laos, here referred as *Helotrephes* sp., may represent a third species or an individual aberration of *H. major* sp.n.

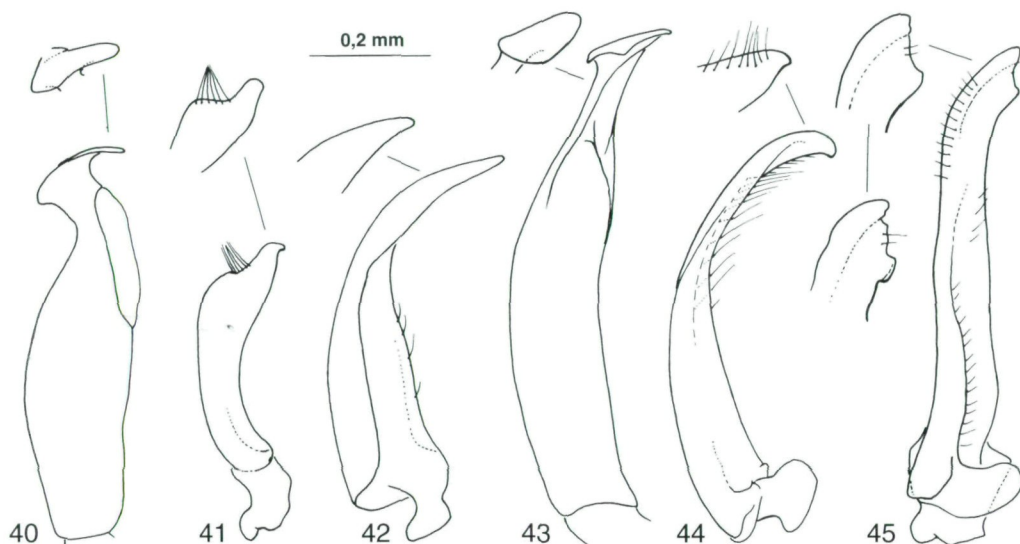
### *Helotrephes sausai* ZETTEL, 1995 (Figs. 40 - 42, 46, 47, 49, 51)

*Helotrephes sausai* ZETTEL, 1995: 292.

**Material examined:** holotype (♂, macropterous): "CHINA-Yunnan 14.-21.6.\ 100 km W Baoshan, 1993\ Gaoligongshan Nat. Res.\ E.Jendek & O.Sausa leg." (NHMW); paratype: 1 ♀, same locality data (NHMW).

**Description:** see ZETTEL (1995).

**Diagnosis** (see also species group characters): Body size, length 3.55 - 3.62 mm, width 2.62 - 2.66 mm. Ground colour dorsally predominantly blackish brown, cephalonotum



Figs. 40 - 45: *Helotrephes sausiai* group: male genitalia of (40 - 42) *H. sausiai* and (43 - 45) *H. major* sp.n.; (40, 43) aedeagus, (41, 44) right paramere, (42, 45) left paramere.

(Fig. 46), mesoscutellum, and hemelytra with yellowish marks. Cephalonotum finely punctate, pronotal part distinctly shining. Mesoscutellum and hemelytron densely set with rather small alveoli. Pronotal plate with shallow, wide incision, posteriorly with convergent sides (Fig. 47). Sternal carinae rather high, reaching sternite 6 in both sexes; prosternal carina posteriorly deeply emarginated, with rounded posterior angle; meta-sternal carina produced posteriad (Fig. 49).

Male genitalia: aedeagus short and stout, with very elongate apical plate (Fig. 40). Right paramere slightly reduced, apically strongly tapered (Fig. 41). Left paramere simple, curved, with acute apex (Fig. 42).

Female: sternite 6 completely separated from sternite 5, with simple, straight hind margin. Subgenital plate short, with broad, tongue-like middle lobe laterally not demarcated (Fig. 51).

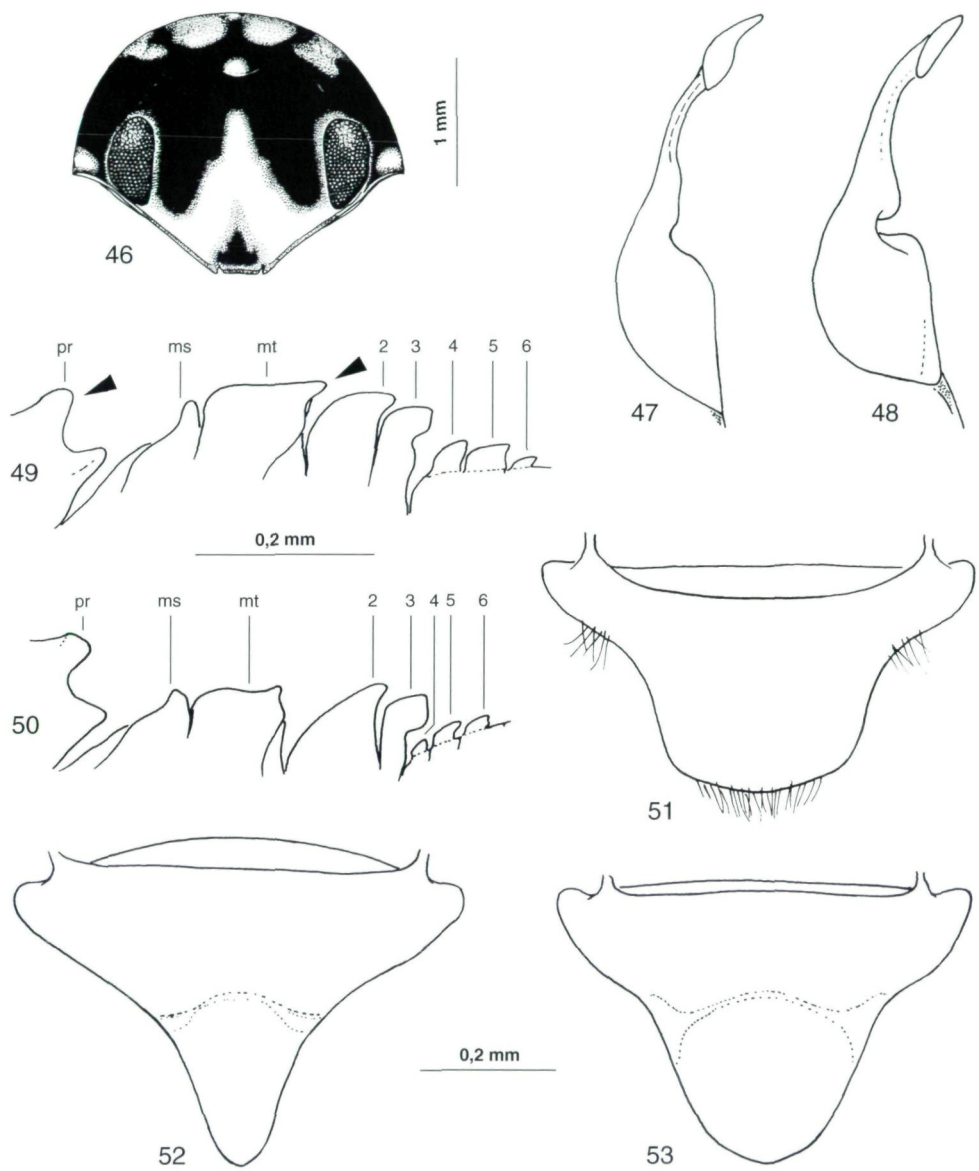
**Comparative notes:** see species group characters and comparative notes of *H. major* sp.n.

**Distribution:** China (Yunnan).

### *Helotrephes major* sp.n. (Figs. 43 - 45, 48, 50, 52)

**Holotype** (♂): "Thailand: Chiang Mai Prov.\ Chiang Dao\ Ban Yang Thung Pong\ 8.XI.1995\ leg. N. Nieser N 9508" (CNT); **paratypes:** 3 ♀♀, same locality data (CNT, JTPC, NHMW); 1 ♂ (cephalonotum crushed, legs partly missing) "Thailand: Chiang Mai\ Doi Suthep NP, Mae Sa\ Falls, 25.III.1994\ leg. W.D.Shepard(1045)" (NHMW).

**Field notes:** Nico Nieser (in litt.) gave us the following field notes for specimens collected by him (N 9508): "stream width 10 - 15 m, depth mostly up to 0.5 m, mountain stream with sand/pebble banks, bottom mostly coarse pebbles filled with sand, strong current in main bed, but samples mostly from quiet parts, Nepidae & Helotrephidae from washed out plant roots and entangled plant debris at edges".



Figs. 46 - 53: *Helotrephes sausiai* group: (46) cephalonotum, frontal view, of *H. sausiai* (from ZETTEL 1995); (47, 48) pronotal and genal plate, ventro-lateral view, of (47) *H. sausiai* and (48) *H. major* sp.n.; (49, 50) sternal carinae (venter turned upward) of (49) *H. sausiai*, ♂, and (50) *H. major* sp.n., ♂; (51 - 53) female subgenital plate of (51) *H. sausiai*, (52) *H. major* sp.n., and (53) *Helotrephes* sp. (from Laos).

**Description** (see also species group characters): Body size, brachypterous form: length 3.39 - 3.58 mm, width 2.39 - 2.46 mm. Ground colour yellowish brown, heavily marked

with deep brown. Cephalonotum with complex pattern of brown markings; anteriorly mostly yellowish, between eyes with several large brown markings coalescing medially; with a brown area behind eyes, and extensive variegated brownish markings on pronotum. Base of mesoscutellum with a transverse piceous stripe. Mesoscutellum mostly light coloured, with dark markings only basally and laterally. Hemelytra mostly covered with dark brown irregular markings, punctations usually not appearing dark. Venter brown. Legs and antennae yellowish brown, legs darker distally, rostrum brown.

Cephalonotum shining, convex, set with small alveoli, in dorsal view (of entire insect) much broader than long (2.44 : 1.17), lateral margins carinate. Pronotal plate with a deep narrow notch, with slightly rounded posterior angles (Fig. 48). Mesopleural and propleural plates not notched. Eye length : width, 0.60 : 0.30. Interocular distance 1.35. Lengths of rostral segments 3 and 4: 0.23, 0.42.

Mesoscutellum weakly shining, set with tiny depressed alveoli, each with one short seta, each surrounded by a roughly circular transparent region; length : width, 1.53 : 1.49.

Hemelytra opaque, faintly shining, alveoli usually not dark, depressed, each with a long slender seta. Ventral carinae prominent; prosternal carina emarginate posteriorly; metasternal carina obtuse posteriorly (Fig. 50); carina of segment 6 present in both sexes, but very small in females.

Male: aedeagus long, distally slender, with large apical plate (Fig. 43). Right paramere long, slender, strongly curved and twisted (Fig. 44). Left paramere straight, with posterior lobe reduced to base, apically stout, with irregularly truncate apex (Fig. 45).

Female: sternite 6 with convex produced posterior margin. Subgenital plate with long, narrow, tongue-like distal part (Fig. 52).

**Comparative notes:** Males of *H. major* sp.n. differ from all other species by the straight, apically stout and truncate left paramere (Fig. 45), females by the unique shape of the subgenital plate (Fig. 52). From *H. sausai*, its closest relative, *H. major* sp.n. is also distinguishable by a less dark colouration, a coarser sculpturation of hemelytra, a deeper and narrower incision of the pronotal plate (Fig. 48), and a posteriorly obtuse metasternal carina (Fig. 50). See also the notes for the following "species" from Laos.

**Distribution:** Thailand (Chiang Mai).

**Etymology:** *major* (Latin, adj., comparative of *magnus*) meaning larger, referring to the relatively large body size.

### *Helotrephes* sp. (Fig. 53)

**Material examined:** 1 ♀ "LAOS: Luang Nam Tha Pr.\ 5km S Muang Sing\ 650m, 10.6.1996\ leg. Schillhammer (21)" (NHMW).

**Description and comparative notes** (see also species group characters and *H. major* sp.n.): Body size, brachypterous form: length 3.48 mm, width 2.43 mm. Head with indistinct brownish marks in anterior half. Female sternite 6 slightly produced posteriad, hind margin medially nearly straight. Female subgenital plate with long, but broad, tongue-like distal part (Fig. 53).

Except in the sternite 6 and the subgenital plate, the female completely corresponds with females of *H. major* sp.n. from North Thailand. However, as these characters are very stable in other species, it is assumed that the specimen represents a further species, although it is not impossible that they are only aberrant. For a description, more specimens (especially males) must be available.

**Distribution:** Laos (Luang Nam Tha).

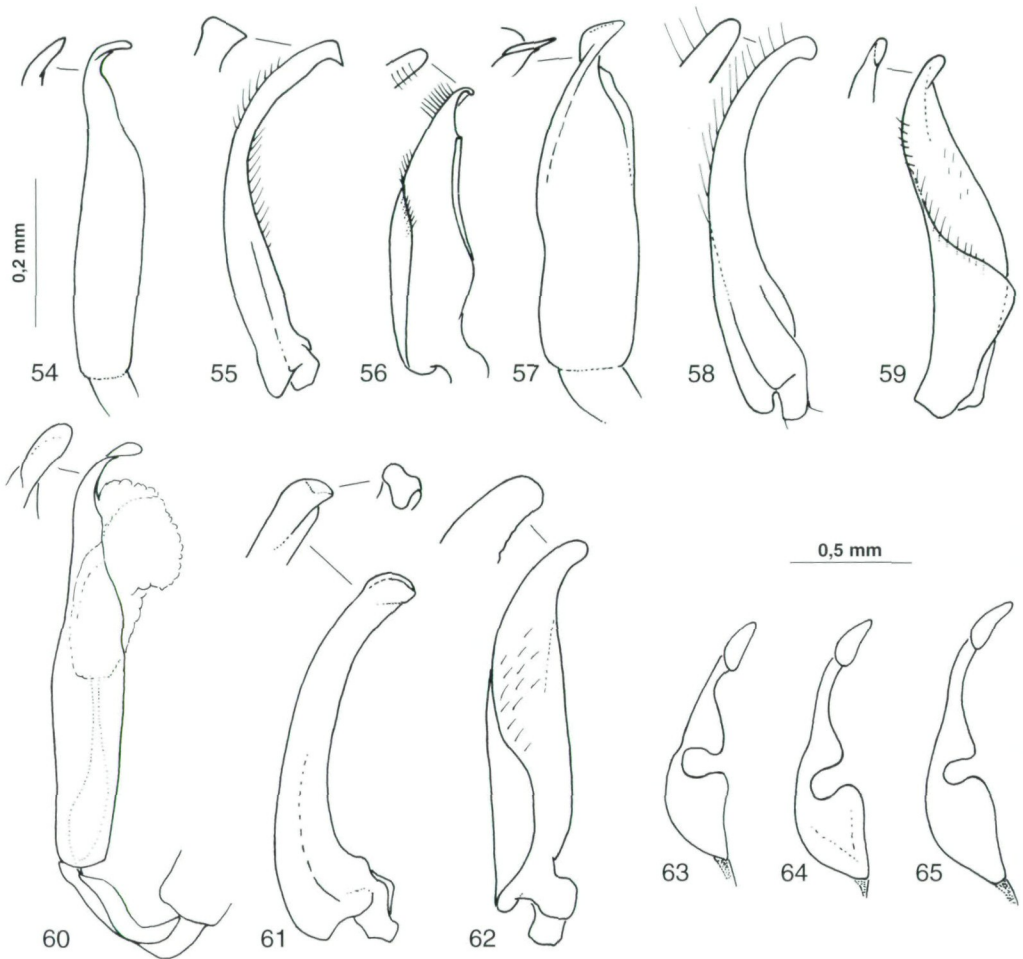
### *The Helotrephes australis group*

**Diagnosis:** relatively small species, body length 2.4 - 2.8 mm. Relatively bright coloured. Cephalonotum with dense, medium sized punctuation, mat; hind margin of cephalonotum laterally without tubercles. Pronotal plate with deep and broad incision, posteriorly not dilated, with convergent sides. Prosternal carina with an acute posterior angle\* and emarginated posteriorly. Male genitalia: aedeagus slender, without apical plate; right paramere very slender\*, with straight or slightly right-bent apex (modified in *H. nieserianus* sp.n.); left paramere relatively broad, with more or less curved apex. Female with broadly convex hind margin of sternite 6. Female subgenital plate with rounded or truncate, not stalked, middle lobe.

The group contains three species, one of them widely distributed in Thailand, Laos, and Malaysia, one from North Thailand and North Laos, and one from North Thailand.

### *Helotrephes australis* sp.n. (Figs. 1, 54 - 56, 63, 66, 69)

**Holotype** (♂): "Thailand:Chiang Mai Prov.\ W Mae Rim, Mae Sa NP\ Mae Sa Falls,30.-31.10.\ 1995, leg. H. Zettel (2)" (NHMW); **paratypes**: 22 ♂♂, 5 ♀♀, same locality data (NHMW, BMNH, CMUT, JTPC, KKUA, KKUB); 2 ♀♀ "THAILAND: Chiang Mai Prov.\ Mae Sa Waterfall, 7 km.\ W. of Mae Rim\ CL 2203 XI-18-85\ J.T. & D.A.Polhemus" (JTPC); 1 ♂, 4 ♀♀ "Thailand: Chiang Mai\ Suanrim, Nam Mae Sa\ 25.III.1994\ leg.W.D.Shepard(1046)" (CSS, NHMW); 3 ♂♂, 1 ♀ "Thailand: Chiang Mai\ Doi Sut[h]ep NP, Mae Sa\ Falls, 25.III.1994\ leg.W.D.Shepard(1045)" (CSS, NHMW); 1 ♂ "Thailand: Chiang Mai\ Doi Sut[h]ep NP,Monthatarn\ Falls, 24.III.1994\ leg.W.D.Shepard(1044)" (CSS); 1 ♂, 1 ♀ "Thailand: Chiang Mai\ Doi Sut[h]ep NP, Wan\ Bua Boon, 24.III.1994\ leg.W.D.Shepard(1042)" (CSS, NHMW); 1 ♀ "Thailand: Chiang Mai Prov.\ Doi Inthanon NP, Mae Klang\ Falls, 4.11.1995\ leg. H. Zettel (6)" (NHMW); 1 ♂♂, 2 ♀♀, and 6 ♂♂, 2 ♀♀ macropterous "Thailand: Chiang Mai Prov.\ Chiang Dao,Ban Yang Thung\ Pong, 500m, 8.11.1995\ leg. H. Zettel (10)" (NHMW); 2 ♂♂, and 1 ♂, 1 ♀ macropterous "Thailand: Chiang Mai Prov.\ Chiang Dao\ Ban Yang Thung Pong\ 8.XI.1995\ leg. N. Nieser N 9508" (CNT); 1 ♀ Thailand: Chiang Mai Prov.\ Chiang Dao, 500 m\ 7.XI.1995\ leg. N. Nieser N 9506" (CNT); 4 ♂♂, 6 ♀♀ "Thailand: Mae Hong Son Prov.\ 17 rd.km N Mae Hong Son\ Mok Cham Pae,nr.Fish Cave\ 11.11.1995,leg.Zettel(12a)" (NHMW); 1 ♂, 1 ♀ "Thailand: Mae Hong Son Prov.\ 17 rd.km N Mae Hong Son\ Mok Cham Pae,nr.Fish Cave\ 11.11.1995,leg.Zettel(12b)" (NHMW); 2 ♀♀ "Thailand: Mae Hong Son\ 17km N Mae Hong Son\ nr. "Fish Cave", 11.XI.1995\ leg. N. Nieser N 9510" (CNT); 1 ♀ Thailand: Mae Hong Son Pr.\ 17 km N Mae Hong Son\ nr. "Fish Cave", 11.XI.1995\ leg. N. Nieser N 9509" (CNT); 3 ♂♂ Thailand: Mae Hong Son Pr.\ Mae Hong Son River, just\ upstream dam, 13.XI.1995\ leg. N. Nieser N 9513" (CNT); 1 ♀ "Thailand: Mae Hong Son Prov.\ Pha Bong, 12km S Mae Hong\ Son, 12.11.1995,leg.Zettel(13a)" (NHMW); 2 ♀♀ "Thailand: Chayaphum\ Phu Keio NP\ Nam Prom, 12.III.1994\ leg.W.D.Shepard(1037)" (CSS, NHMW); 3 ♂♂, 2 ♀♀, and 1 ♂ macropterous "THAILAND: Narathiwat\ Prov.; 14 Km W Srisakhon\ 15 January 1995; stream\ colls: Sites & Nichols" (UMRM, JTPC); 3 ♀♀ "THAILAND: Songkhla\ Khao Nam Chang\ ca. 21 km SW Nathawi\ 13 Jan. 1995; L-72\ coll: RW Sites + B. Nichols" (UMRM); 1 ♀ "THAILAND: Songkhla\ Ton Nga Chang Nat.Pk.\ waterfall levels 2+3\ 8 Jan. 1995; L-66\ coll: Sites + Nichols" (UMRM); 1 ♂, 1 ♀ "THAILAND: Trang Prov.\ ca. 10 km E Khao Ka Chong\ National Park on Hwy 4\ 12 January 1995 ; L-69\



Figs. 54 - 65: *Helotrephes australis* group: (54 - 56) *H. australis* sp.n., (57 - 59) *H. incisus* sp.n., and (60 - 62) *H. nieserianus* sp.n.; (54, 57, 60) aedeagus, (55, 58, 61) right paramere, (56, 59, 62) left paramere; (63 - 65) pronotal and genal plate, ventro-lateral view, of (63) *H. australis* sp.n., (64) *H. incisus* sp.n., and (65) *H. nieserianus* sp.n.

coll: Sites & Nichols" (UMRM); 4 ♂♂, 3 ♀♀ "THAILAND : Yala Prov.\ Than To; Banglang N.P.\ 14 January 1995 ; L-73\ coll: Sites & Nichols" (UMRM, JTPC, NHMW); 1 ♀ macropterous "LAOS: Luang Nam Tha Pr.\ 5km S Muang Sing\ 650m, 10.6.1996\ leg. Schillhammer (21)" (NHMW); 1 ♂, 1 ♀ "Malaysia: Selangor\ 8 km S K.Kubu Bahru\ Sengai Selangor, 11.IV.1994, leg. Shepard(1069)" (NHMW); 2 ♀♀ "W.Malaysia\ Selangor \ Sungai Kanching\ Templer Park\ VIII-28-78\ GF & CH Edmunds" (JTPC); 2 ♂♂, 3 ♀♀, "19.11.95 West Malaysia 841/10\ Ulu Gombag [Gombak]. leg. D. Kovac\ spec. No 4" (Senckenberg Museum); 1 ♂, 1 ♀ "W MALAYSIA: Pahang\ Benom Mts., 3,53N 102,01E\ 1,5km E Kampong Dong\ 24.3.-15.4.1998, 300-1000m\ Dembicky & Pacholatko leg." (NHMW); 1 ♂ "Janabaik [locality and province unknown]\ Malaysia\ 28-VII-1987\ M. Satô leg." (JTPC).

**Field notes:** Nico Nieser (in litt.) gave us the following field notes for specimens collected by him: N 9506: "stream outside Doi Chiang Dao WLS, sample from stagnant parts & bays"; N 9508: see under *H. major* sp.n.; N 9509: "stream along road to Pha Sua waterfall, quiet bay with slightly muddy sand bottom, on edge

with dense stand of reed-like Poaceae"; N 9510: see under *H. nieserianus* sp.n.; N 9513: "from patch of floating plant-debris entangled by some branches".

**Description** (see also species group characters): Body size, brachypterous form: length 2.38 - 2.77 mm, width 1.55 - 1.83 mm; macropterous form: length 2.55 - 2.69 mm, width 1.82 - 1.93 mm. Ground colour yellowish brown, extensively marked with brown. Cephalonotum with complex pattern of brown markings (Fig. 1); anterior extreme mostly yellowish, remainder of cephalonotum, hemelytra, mesoscutellum with an extensive pattern of deep brown irregular, reticulated markings, punctations appearing light or dark. Base of mesoscutellum with a transverse deep brown stripe. Venter yellowish brown. Legs and antennae yellowish, legs slightly darker distally, rostrum light brown.

Cephalonotum shining, convex, set with small alveoli, in dorsal view (of entire insect) much broader than long (1.78: 0.97) lateral margins carinate. Pronotal plate with a very deep, ovate, basally constricted notch (Fig. 63). Mesopleural and propleural plates not notched. Eye length : width, 0.53 : 0.33 (0.60 : 0.39 in macropterous form). Interocular distance 0.86 (0.82 in macropterous form). Lengths of rostral segments 3 and 4: 0.19, 0.53.

Mesoscutellum weakly shining, set with tiny depressed alveoli, each with one long slender seta, each surrounded by a roughly circular transparent region; length : width, 1.05 : 1.12.

Hemelytra opaque, faintly shining, alveoli dark, depressed, each with a long slender seta. Ventral carinae prominent; prosternal carina with acute tip, somewhat produced and directed postero-ventrad, emarginate posteriorly; carina of segment 3 with short hairs (Fig. 66).

Male: aedeagus with simple, slender, strongly curved apex (Fig. 54). Right paramere distally very slender, with weakly hooked apex (Fig. 55). Left paramere distally slender, with subapical row of bristles (Fig. 56).

Female: subgenital plate simply tongue-like posteriorly, with convex hind margin (Fig. 69).

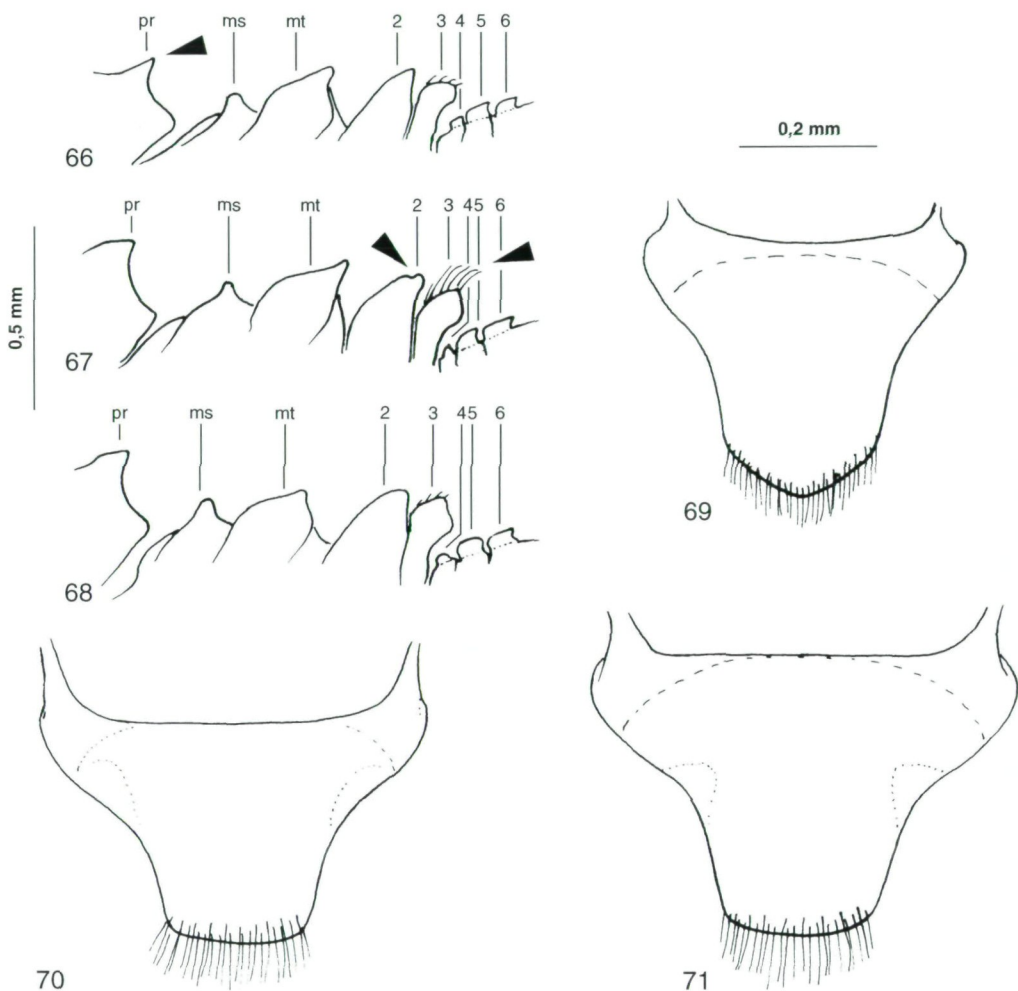
**Comparative notes:** *Helotrephes australis* sp.n. is the most widely distributed and most common *Helotrephes* in Thailand, where it differs by the large notch of the propleural plate from most other congeners. The male genitalia (Figs. 54 - 56) are very characteristic and not variable over the large distribution area of the species. *Helotrephes australis* sp.n. is lighter coloured than the very similar *H. incisus* sp.n. and *H. nieserianus* sp.n., and differs from both species in the posteriorly convex female subgenital plate (Fig. 69). It was found together with *H. nieserianus* sp.n. in one locality in Chiang Mai Province. For comparison see notes for those two species.

**Distribution:** Thailand (Mae Hong Son, Chiang Mai, Chayaphum, Narathiwat, Trang, Songkhla, Yala), Laos (Luang Nam Tha), Malaysia (Selangor, Pahang).

**Etymology:** The specific epithet refers to the distributions of this species which is one of the most southern within the genus.

### *Helotrephes incisus* sp.n. (Figs. 57 - 59, 64, 67, 70)

**Holotype** (♂): "Thailand: P[h]etchabun\ 36 km SE Sila, Huai\ Nam Phang, 2.III.1994\ leg.W.D.Shepard(1024)" (NHMW); **paratypes:** 2 ♀♀ same locality data (NHMW, CSS); 20 ♂♂, 14 ♀♀ "Thailand: Phetchabun Prov.\ 36km SE Sila, N Ban Nam\ Nao,Ban Pala Yai,25.11.\ 1995, leg.H.Zettel(27)" (NHMW, BMNH, CNT,



Figs. 66 - 71: *Helotrephes australis* group: (66 - 68) sternal carinae of males of (66) *H. australis* sp.n., (67) *H. incisus* sp.n., and (68) *H. nieserianus* sp.n.; (69 - 71) female subgenital plate of (69) *H. australis* sp.n., (70) *H. incisus* sp.n., and (71) *H. nieserianus* sp.n.

CSS, JTPC, KKUA, KKUB); 4 ♂♂, 1 ♀ "THAILAND, Chiang Mai Prov.\ Huay Hia Creek\ Fang Horticultural Station\ CL 2198, 15.XI.1995, 500 m.\ J.T. & D.A. Polhemus" (JTPC, NHMW).

**Field notes:** collected by the first author in a small, shallow streamlet (0.5 - 1.5 m wide) among vegetation along the edge.

**Description** (see also species group characters): Body size, brachypterous form: length 2.39 - 2.61 mm, width 1.78 - 1.83 mm. Ground colour yellowish brown, extensively marked with brown. Cephalonotum with complex pattern of brown markings extending onto anterior extreme, remainder of cephalonotum, hemelytra, mesoscutellum with an extensive pattern of deep brown irregular, reticulated markings, punctations appearing light or dark. Base of mesoscutellum with a transverse deep brown stripe. Venter yellowish brown. Legs and antennae yellowish, legs slightly darker distally, rostrum light brown.

Cephalonotum shining, convex, set with small alveoli, in dorsal view (of entire insect) much broader than long (1.83: 1.00) lateral margins carinate. Pronotal plate with a very deep, broad, basally not constricted notch (Fig. 64). Mesopleural and propleural plates not notched. Eye length : width, 0.53 : 0.26. Interocular distance 1.02. Lengths of rostral segments 3 and 4: 0.19, 0.44.

Mesoscutellum weakly shining, set with tiny depressed alveoli, each with one long slender seta, each surrounded by a roughly circular transparent region; length : width, 1.42 : 1.46.

Hemelytra opaque, faintly shining, alveoli dark, depressed, each with a long slender seta. Ventral carinae prominent; prosternal carina with acute tip (sometimes narrowly rounded), directed posteriad, emarginate posteriorly; mesosternal carina relatively sharp; carina of sternite 2 often with a minute apical emargination; carina of sternite 3 with long hairs; carina of sternite 6 small, present in both sexes (Fig. 67).

Male genitalia: aedeagus wide, apically strongly twisted, with sharp dorso-apical carina, without apical transverse plate (Fig. 57). Right paramere with large lobe turned cephalad, with row of setae along posterior margin, and with apex finger-like, rounded (Fig. 58). Left paramere continuously narrowed from base to tip, along posterior margin with row of setae, with rounded apex (Fig. 59).

Female: subgenital plate simply tongue-like, posteriorly truncate (Fig. 70).

**Comparative notes:** *Helotrephes incisus* sp.n. differs from *H. australis* sp.n. in a darker colouration of the cephalonotum (but not as extensive as in *H. nieserianus* sp.n., see there), in the tip of the prosternal carina, which is not as sharply produced nor directed ventrad (Fig. 67), and in the wider incision of the pronotal plate (Fig. 64); and from *H. australis* sp.n. and *H. nieserianus* sp.n. in a conspicuously long pilosity on the carina of sternite 3 (Fig. 67). Male genitalia (Figs. 57 - 59) are diagnostic, especially the upright lamina on the apex of the aedeagus (Fig. 57). The female subgenital plate (Fig. 70) is truncate and not rounded as in *H. australis* sp.n.

**Distribution:** Thailand (Phetchabun, Chiang Mai).

**Etymology:** *incisus* (Latin, adj.) = "incised", referring to the deeply and widely incised pronotal plate.

### *Helotrephes nieserianus* sp.n. (Figs. 60 - 62, 65, 68, 71)

**Holotype** (♂): "Thailand: Mae Hong Son\ 17km N Mae Hong Son\ nr. "Fish Cave", 11.XI.1995\ leg. N. Nieser N 9510" (CNT); **paratypes**: 1 ♂, 5 ♀♀ "Thailand: Chiang Mai Prov.\ Chiang Dao, Ban Yang Thung\ Pong, 500m, 8.11.1995\ leg. H. Zettel (10)" (NHMW, JTPC); 1 ♀ macropterous "N LAOS,\ Luang Namtha env.\ 800 - 1200 m,\ May 1997" (NHMW).

**Field notes:** Nico Nieser (in litt.) sent us the following collecting notes on the holotype: "stream along road to Pha Sua waterfall, upstream of a small dam, wide open area; stream about 25 m wide, with mud/sand/pebble-bank in centre; collected at edge between Poaceae hanging into the water; not much shade". The first author collected *H. nieserianus* sp.n. in Chiang Mai intermixed with the more common *H. australis* sp.n. (locality see field notes of *H. major* sp.n.: N 9508).

**Description** (see also species group characters): Body size, brachypterous form: length 2.47 - 2.87 mm, width 1.83 - 2.11 mm; macropterous form: length 2.71 mm, width 2.02 mm. Ground colour yellowish brown, extensively marked with brown. Cephalonotum with complex pattern of brown markings extending onto anterior extreme as a broad black

stripe, remainder of cephalonotum, hemelytra, mesoscutellum with an extensive pattern of deep brown irregular, reticulated markings, punctations appearing light or dark, very similar to *H. incisus* sp.n. Base of mesoscutellum with a transverse deep brown stripe. Venter mostly dark brown. Legs and antennae yellowish, legs slightly darker basally and distally, rostrum brown.

Cephalonotum dull, somewhat encrusted, convex, set with small alveoli, in dorsal view (of entire insect) much broader than long (1.83 : 1.00) lateral margins carinate. Pronotal plate with a very deep, ovate, basally slightly constricted notch (Fig. 65). Mesopleural and propleural plates not notched. Eye length : width, 0.58 : 0.35 (0.64 : 0.40 in macropterous form). Interocular distance 0.86 (0.97 in macropterous form). Lengths of rostral segments 3 and 4: 0.19, 0.53.

Mesoscutellum weakly shining, set with tiny depressed alveoli, each with one long slender seta, each surrounded by a roughly circular transparent region; length : width, 1.22 : 1.17.

Hemelytra opaque, faintly shining, alveoli dark, depressed, each with a long slender seta. Ventral carinae prominent; prosternal carina with acute tip, not produced and directed almost posteriad, emarginate posteriorly; carina of sternite 3 without long hairs (Fig. 68).

Male aedeagus distally slender, with long, broad, curved apical lamina (Fig. 60). Right paramere distally broad, apically rounded and recurved (Fig. 61). Left paramere distally rather broad, apically broadly rounded (Fig. 62).

Female: subgenital plate simply tongue-like, posteriorly truncate (Fig. 71).

**Comparative notes:** *Helotrephes nieserianus* sp.n. is similar to *H. australis* sp.n. and *H. incisus* sp.n. in general appearance, but has a darker colouration of head reaching medially the anterior margin. Males differ clearly in the stout right paramere, which has a recurved and rounded apex (Fig. 61), by the apex of the aedeagus with a relatively broad apical lamina (Fig. 60), and by the simple, broader apex of the left paramere (Fig. 62). The female subgenital plate is similar to that of *H. incisus* sp.n., but more truncate than in *H. australis* sp.n. Females may be distinguished from *H. incisus* sp.n. by the inconspicuous pilosity on the carina of sternite 3 (Fig. 68), and by a narrower incision of the pronotal plate (Fig. 65).

**Distribution:** Thailand (Mae Hong Son, Chiang Mai), Laos (Luang Nam Tha).

**Etymology:** This species is dedicated to Dr. Nico Nieser (Tiel), who collected this and several other rare species. We avoid the name "*nieseri*", because of *Hydrotrepes nieseri* POLHEMUS, 1997, as a new generic arrangement of Helotrephini may cause a homonym.

### The *Helotrephes otoeis* group

**Diagnosis:** relatively small species, body length 2.14 - 2.55 mm. Usually brightly coloured, with a distinct row of black dots along hind margin of cephalonotum. Cephalonotum with dense and coarse punctation\*, mat; hind margin of cephalonotum laterally with two (prominent) tubercles\*. Genal plate wide. Pronotal plate with shallow incision, posteriorly truncate\*. Prosternal carina slightly emarginated posteriorly. Male genitalia: aedeagus slender, bent cephalad in distal part, without or with small apical plate; right paramere very slender, also at base\*, with a twisted, more or less angular apex; left paramere simple, evenly tapered towards tip. Female (unknown in *H. affinis* sp.n.) sternites 5 and 6 fused;

sternite 6 without median carina, with angularly produced hind margin\*. Female subgenital plate with a small, roundish or truncate, stalked median projection\*.

**Notes:** This species group is very well defined by several autapomorphies. Species are easily recognisable as belonging to this group by the tubercles on the hind margin of pronotum. The group contains six very similar species, two from Borneo, one from Java, two from Thailand, and one from Thailand and South China. Differences are mainly based on male genitalia, especially on the apices of aedeagi and right parameres (see Figs. 72 - 89). The female subgenital plate of each species is diagnostic, but they are all quite similar. They differ in the curvature and pilosity of the lateral margins and the shape of the distal projection (see Figs. 103 - 107). Unfortunately, except of *H. otoeis* and *H. kodadai* sp.n., only a few specimens of the other four species were available for this study, so that a stability of these characters is assumed, those proven to be useful in several other species of *Helotrephes*.

***Helotrephes otoeis* NIESER & CHEN, in press (Figs. 72 - 74, 90, 97, 99, 103)**

**Material examined:** several paratypes (♂♂ and ♀♀) from the Danum Valley, Sabah, deposited in the NHMW and UMS (listed in NIESER & CHEN, in press).

**Diagnosis** (see also species group characters): Body size, brachypterous morph, length 2.22 - 2.42 mm, width 1.82 - 1.99 mm. Ground colour yellowish. Cephalonotum with numerous small brown markings, and with larger spots along hind margin, with strongly developed lateral tubercles, without mediolateral swellings (Fig. 97). Pronotal plate with shallow, wide incision (Fig. 90). Prosternal carina with very shallow emargination; carina of sternite 3 with relatively long hairs (Fig. 99), carinae of sternites 4 - 5 (6) quite variable in height and shape.

Male: aedeagus with a small oblique lamina with half-ovate outline, but without distinct apical plate (Fig. 72). Right paramere apically distinctly widened (Fig. 73). Left paramere relatively wide, with dense subapical row of setae (Fig. 74).

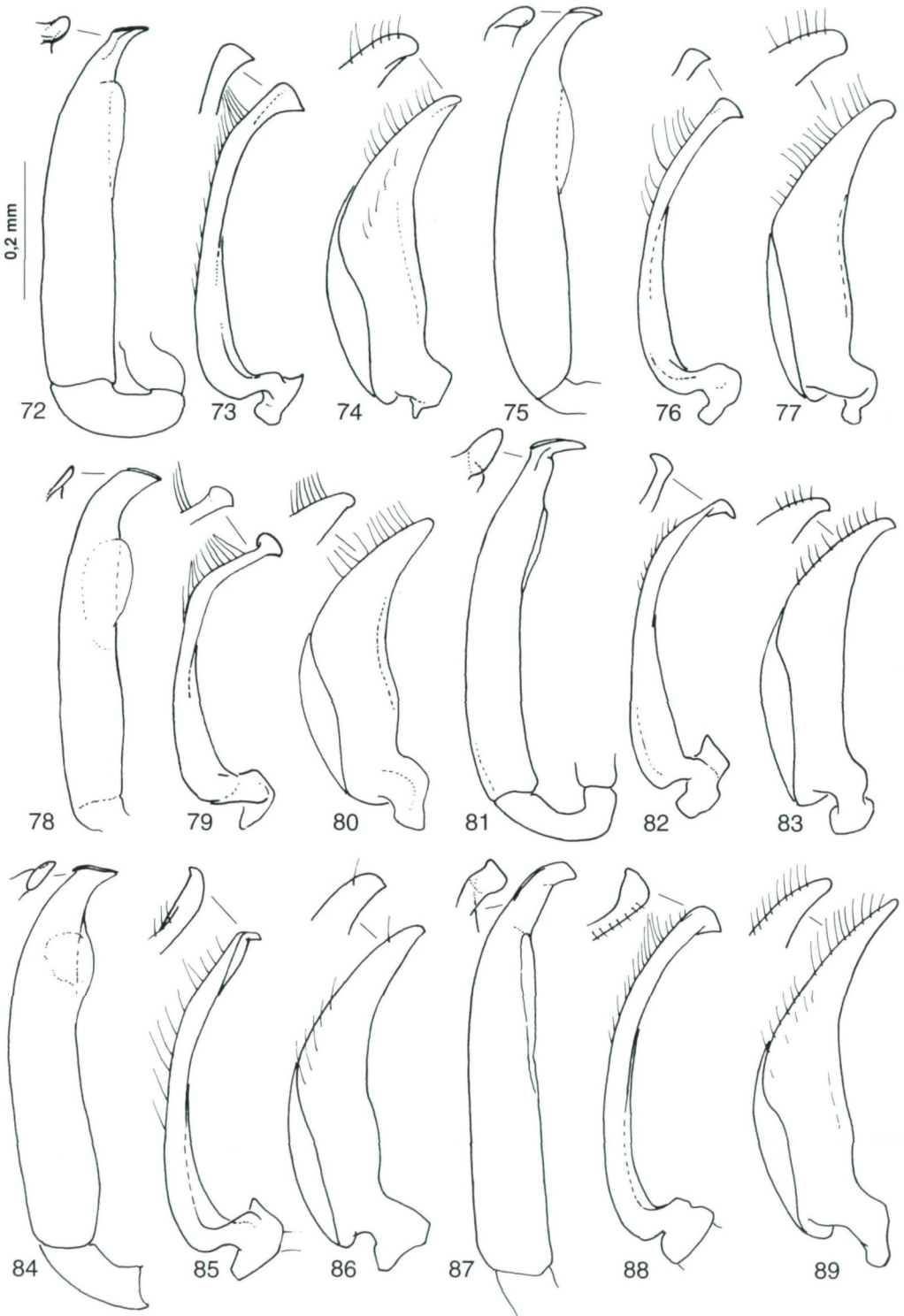
Female: Sternite 6 moderately produced postero-medially, forming an obtuse angle. Subgenital plate with well developed, rather narrow, apically rounded and hirsute middle lobe, and with some hairs laterally at hind margin (Fig. 103).

**Comparative notes:** *Helotrephes otoeis* is similar to the following five species, even in male genitalia. The apex of the aedeagus (Fig. 72) and the female subgenital plate (Fig. 103) are diagnostic. The apex of the right paramere (Fig. 73) is similar to *H. affinis* sp.n. (Fig. 88), but less twisted; and broader than in *H. tuberculatus* sp.n. (Fig. 82). The ventral carinae on sternites 4 - 5 (6) are weakly developed in both sexes. Further differences are mentioned under the following species. *Helotrephes otoeis* is one of two *Helotrephes* species known from Borneo, where it seems to be endemic.

**Distribution:** Malaysia: Sabah.

***Helotrephes kodadai* sp.n. (Figs. 75 - 77, 91, 102, 104)**

**Holotype** (♂): "SARAWAK III.1994\ Rumah Kabau anak muggot\ Ng sebong Baleh\ 25 km E Kapit, I. Kodada" (NHMW); **paratypes:** 12 ♂♂, 9 ♀♀, same locality data (NHMW, CNT, JTPC); 3 ♂♂, 1 ♀ "MALAYSIA: Sarawak\ 25km E Kapit\ III.1994\ leg. Kodada" (NHMW).



**Description** (see also species group characters): Body size, brachypterous form: length 2.14 - 2.33 mm, width 1.76 - 1.97 mm. Ground colour yellowish brown, weakly marked with brown. Cephalonotum with simple, irregular pattern of small brown markings; anteriorly always yellowish; always with small scattered brownish spots on posterior part of head and on pronotum (Fig. 102); with several larger spots along hind margin. Hemelytra, mesoscutellum with weak pattern of deep brown irregular, randomly scattered markings, punctations appearing dark. Venter yellowish brown. Legs and antennae yellowish, legs darker distally, rostrum yellowish.

Cephalonotum shining, convex, set with small alveoli, in dorsal view (of entire insect) much broader than long (1.76 : 1.15), lateral margins carinate, with well developed lateral tubercles, without or with very weak mediolateral swelling along hind margin. Pronotal plate with shallow notch (Fig. 91). Mesopleural and propleural plates not notched. Eye length : width, 0.55 : 0.30. Interocular distance 0.76. Lengths of rostral segments 3 and 4: 0.15, 0.34.

Mesoscutellum weakly shining, set with tiny depressed alveoli, each with one slender seta, each surrounded by a roughly circular transparent region; length : width, 0.93 : 0.82.

Hemelytra opaque, faintly shining, alveoli dark, depressed, each with a slender seta. Ventral carinae prominent, similar to other species of the group; prosternal carina very weakly emarginate posteriorly (as in *H. otoe*; comp. Fig. 99), carinae of sternites 4 - 5 (6) quite variable in height and shape, carinae of sternite 4 often produced posteriad.

Male: aedeagus apically with a small, oblique lamina, apex in lateral view evenly curved (Fig. 75). Right paramere distally twisted, very slender, apically with minute, pointed dilatation (Fig. 76). Left paramere distally rather slender, with a row of subapical bristles (Fig. 77).

Female: Sternite 6 strongly produced postero-medially, forming a nearly right angle, and with a narrow tuft of hairs. Subgenital plate constricted, then parallel, and truncate distally, with a dense median tuft of long golden setae projecting posteriorly, laterally on hind margin with some setae (Fig. 104).

**Comparative notes:** Males of *H. kodadai* sp.n. may be distinguished from *H. otoe* by a slightly smaller apical lamina of the aedeagus (Fig. 75) and a smaller apical dilation of the right paramere (Fig. 76). Females are easily separable, because in *H. kodadai* sp.n. the subgenital plate has a short and truncate median lobe (Fig. 104), which is much longer and rounded in *H. otoe* (Fig. 103); further, the posterior margin of sternite 6 forms a nearly right angle in *H. kodadai* sp.n., but an obtuse angle in *H. otoe*. The female subgenital plate is most similar to that of *H. javanicus* sp.n. (Fig. 105), but this species differs in smaller tubercles on the cephalonotum, the male right paramere (Fig. 79), and female sternite 6.

**Distribution:** Malaysia (Sarawak).

**Etymology:** This species is named after Dr. Jan Kodada (Bratislava), coleopterist and Borneo adventurer, who collected the type series.

Figs. 72 - 89: *Helotrephes otoe*s group: male genitalia of (72 - 74) *H. otoe*s, (75 - 77) *H. kodadai* sp.n., (78 - 80) *H. javanicus* sp.n., (81 - 83) *H. tuberculatus* sp.n., (84 - 86) *H. flaviceps* sp.n., and (87 - 89) *H. affinis* sp.n.; (72, 75, 78, 81, 84, 87) aedeagus, (73, 76, 79, 82, 85, 88) right paramere, (74, 77, 80, 83, 86, 89) left paramere.

***Helotrephes javanicus* sp.n.** (Figs. 78 - 80, 92, 98, 105)

**Holotype** (♂): INDONESIA, Jawa\ Jawa Barat Prov., Ciapus Dist.\ rocky river and waterfall at\ Curug Luhur Recreation Area\ 750 m., 5 Sept. 1991, CL 2579, D. A. & J.T. Polhemus (JTPC); **paratypes**: 2 ♀♀, same locality data (JTPC, NHMW).

**Description** (see also species group characters): Body size, brachypterous form: length 2.32 - 2.33 mm, width 1.72 - 1.74 mm. Ground colour yellow to yellowish brown, extensively marked with brown. Cephalonotum usually mostly yellowish, with dark spots along posterior margin (Fig. 98); mostly light coloured anterad of suture; area behind eyes brownish; pronotum extensively marked with variegated brown except in median anterior curve of suture. Mesoscutellum with base broadly brownish, with two elongate brown spots along each lateral margin. Hemelytra and mesoscutellum with variegated brown markings, punctations mostly dark, except on broad region of corium near hind margin of cephalonotum. Venter yellowish brown. Legs and antennae yellowish, legs darker distally, rostrum brown.

Cephalonotum shining, convex, set with small alveoli, in dorsal view (of entire insect) much broader than long (1.72 : 0.94), lateral margins carinate ahead of eyes, weakly carinate behind eyes. Pronotal plate with shallow notch (Fig. 92). Mesopleural and propleural plates not notched. Eyes broad, length : width, 0.49 : 0.30. Interocular distance 0.79. Lengths of rostral segments 3 and 4: 0.14, 0.33.

Mesoscutellum weakly shining, set with tiny depressed alveoli, each with one (usually) short slender seta, each surrounded by a roughly circular transparent region; length : width, 0.93 : 0.98.

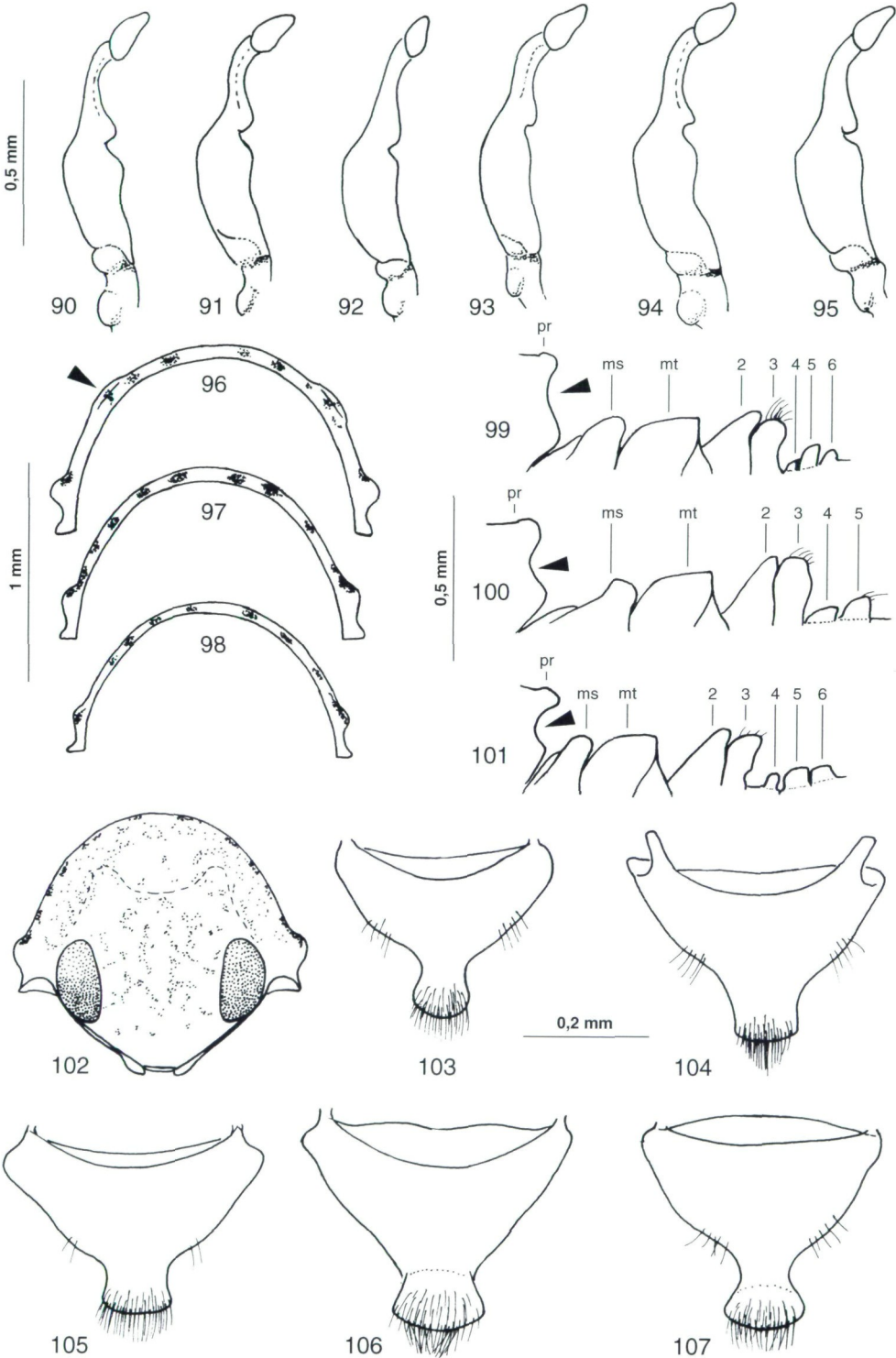
Hemelytra opaque, faintly shining, alveoli dark, depressed, each with a (usually) short slender seta. Ventral carinae prominent; prosternal carina weakly emarginate posteriorly (as in *H. otoeïs*, comp. Fig. 99).

Male: Segment 8 with a pronounced digitate projection on left side. Aedeagus distally strongly bent in lateral view, with very small, narrow apical lamina, without apical plate (Fig. 78). Right paramere distally very slender, strongly bent and twisted, with the apex nearly symmetrically expanded (Fig. 79). Left paramere relatively broad (Fig. 80).

Female: Sternite 6 moderately produced postero-medially, forming an obtuse angle, and with a broad medial, posteriad directed pilosity. Subgenital plate with lateral margins curved, constricted distally, then widened and truncate distally, with many long golden setae projecting posteriorly along entire distal margin (Fig. 105).

**Comparative notes:** *Helotrephes javanicus* sp.n. may be separated from all other species of the *H. otoeïs* group by the relatively broad eyes, smaller but distinct costal lobe in

Figs. 90 - 107: *Helotrephes otoeïs* group: (90 - 95) pronotal and genal plate, ventro-lateral view, of (90) *H. otoeïs*, (91) *H. kodadai* sp.n., (92) *H. javanicus* sp.n., (93) *H. tuberculatus* sp.n., (94) *H. flaviceps* sp.n., and (95) *H. affinis* sp.n.; (96 - 98) hind margin of cephalonotum, caudal view, of (96) *H. flaviceps* sp.n., (97) *H. otoeïs*, and (98) *H. javanicus* sp.n.; (99 - 101) sternal carinae, lateral view, venter turned upward, of (99) *H. otoeïs*, ♂, (100) *H. flaviceps* sp.n., ♀, and (101) *H. affinis* sp.n., ♂; (102) cephalonotum of *H. kodadai* sp.n., frontal view; (103 - 107) female subgenital plate of (103) *H. otoeïs*, (104) *H. kodadai* sp.n., (105) *H. javanicus* sp.n., (106) *H. tuberculatus* sp.n., and (107) *H. flaviceps* sp.n.



both sexes, and the male genitalia. The right paramere is diagnostic, its nearly symmetrically expanded apex (Fig. 79) not resembling any of the other five species of the *H. otoe* group. The apex of the aedeagus is formed by a small, oblique lamina (Fig. 78), which is more slender in end view than in *H. otoe*, *H. kodadai* sp.n., or *H. tuberculatus* sp.n. The shape of the female subgenital plate (Fig. 105) is very similar to that of *H. kodadai* sp.n., but the female sternite 6 forms a very obtuse angle medially in *H. javanicus* sp.n., and a nearly right angle in *H. kodadai* sp.n. The weakly emarginated prosternal carina is similar in the two Bornean species, with which *H. javanicus* sp.n. seems more closely related than with the species from the Southeast Asian mainland.

**Etymology:** named for the island of origin, Java.

### *Helotrephes tuberculatus* sp.n. (Figs. 81 - 83, 93, 106)

**Holotype** (♂): "Thailand: P[h]etchabun\ Huai Sui Thong, Huai\ Su Nam, 27.III.1994\ leg. W.D. Shepard (1049)" (NHMW); **paratypes**: 1 ♀ same locality data (NHMW); 1 ♂ "CHINA: Hainan (215)\ 15km SW Dongxing\ 1,5km W Jiangfang, 70m\ 25.I.1996, leg. Jäch" (NHMW).

**Description** (see also species group characters): Body size, brachypterous form: length 2.28 - 2.44 mm, width 1.61 - 1.78 mm. Ground colour yellowish brown, weakly marked with brown. Cephalonotum with simple pattern of brown markings, anteriorly always yellowish, sometimes with broad area of poorly defined brown markings between eyes and between eyes and suture; always with a brown area behind eyes, and small scattered brownish spots on pronotum; with several larger spots along hind margin. Base of mesoscutellum with a transverse deep brown stripe. Hemelytra, mesoscutellum with weak pattern of deep brown irregular, randomly scattered markings, punctations appearing dark. Venter brown. Legs and antennae yellowish, legs darker distally, rostrum brown.

Cephalonotum shining, convex, set with small alveoli, in dorsal view (of entire insect) much broader than long (1.61 : 0.94), lateral margins carinate, with well developed lateral tubercles, without (specimens from Phetchabun) or with very weak (specimen from Hainan) mediolateral swelling along hind margin. Pronotal plate with shallow notch (Fig. 93). Mesopleural and propleural plates not notched. Eye length : width, 0.51 : 0.28. Interocular distance 0.77. Lengths of rostral segments 3 and 4: 0.17, 0.28.

Mesoscutellum weakly shining, set with tiny depressed alveoli, each with one slender seta, each surrounded by a roughly circular transparent region; length : width, 0.86 : 0.98.

Hemelytra opaque, faintly shining, alveoli dark, depressed, each with a slender seta. Ventral carinae prominent, similar than in other species of the group; prosternal carina weakly emarginate posteriorly (as in *H. flaviceps* sp.n., comp. Fig. 100).

Male: aedeagus apically with a small, oblique lamina, in lateral view (Fig. 81). Apex of right paramere strongly twisted, very slender and forming a small hook (Fig. 82). Left paramere distally rather slender, with a row of subapical bristles (Fig. 83).

Female: subgenital plate constricted, then widened and angulate distally, with a narrow median tuft of long golden setae projecting posteriorly, laterally on hind margin without setae (Fig. 106).

**Comparative notes:** *Helotrephes tuberculatus* sp.n. is very similar to *H. otoe*, especially the apical lamina of the aedeagus, which is, however, larger in *H. tuberculatus* sp.n.

(Fig. 81). The female subgenital plate (Fig. 106) is similar to that of *H. flaviceps* (Fig. 107), but the sides of the distal lobe are linearly divergent. The carinae on sternites 4 - 6 are better developed than in *H. otoeis* and *H. flaviceps* sp.n.

**Distribution:** Thailand (Phetchabun), China (Hainan).

**Etymology:** *tuberculatus* (Latin, adj.) meaning "with tubercles", referring to the tubercles on the hind margin of the pronotum which are typical for the species group.

***Helotrephes flaviceps* sp.n.** (Figs. 84 - 86, 94, 96, 100, 107)

**Holotype** (♂): "Thailand: Mae Hong Son Prov.\ 17 rd.km N Mae Hong Son\ Mok Cham Pae,nr.Fish Cave\ 11.11.1996,leg.Zettel(12b)" (NHMW); **paratype:** 1 ♀, same locality data (NHMW); 1 ♂ "21 XII 1997 Thaild.\ ca. 12 km N of Mae Hong Son", "Tam Pla Resort\ at Tam Pla River\ Dr. W. Ullrich leg.", "N 019° 25' 34.2" E 097° 59' 16.7" ", "Dr. Wolfgang G.\ ULLRICH\ collection" (coll. Ullrich, Lübeck); 1 ♀ "THAILAND: Songkhla\ Prov.; Khao Nam Chang\ ca. 21 km SW Nathawi\ 13 Jan 1995; L-72\ coll: Sites & Nichols" (JTPC); 1 ♀ "THAILAND: Yala Prov.\ stream 9 km N Than To\ 15 January 1995\ colls: Sites & Nichols" (UMRM).

**Description** (see also species group characters): Body size, brachypterous form: length 2.39 - 2.55 mm, width 1.89 - 2.00 mm. Ground colour yellow to yellowish brown, very weakly marked with brown. Cephalonotum usually mostly yellowish, with dark spots along posterior margin (Fig. 96); anteriorly always completely yellowish except anteclypeus occasionally dark, sometimes with a weakly brownish area behind eyes; with several larger spots along hind margin. Mesoscutellum with base sometimes brownish, with three or four brown spots along each lateral margin. Hemelytra without brown markings, but punctations often appearing dark, especially near base of mesoscutellum. Venter yellowish brown. Legs and antennae yellowish, legs darker distally, rostrum brown.

Cephalonotum shining, convex, set with small alveoli, in dorsal view (of entire insect) much broader than long (1.94 : 0.94), lateral margins carinate. Pronotal plate with shallow notch (Fig. 94). Mesopleural and propleural plates not notched. Eye length : width, 0.61 : 0.22. Interocular distance 0.83. Lengths of rostral segments 3 and 4: 0.17, 0.39.

Mesoscutellum weakly shining, set with tiny depressed alveoli, each with one (usually) short slender seta, each surrounded by a roughly circular transparent region; length: width; 1.11 : 1.05.

Hemelytra opaque, faintly shining, alveoli dark, depressed, each with a short slender seta. Ventral carinae prominent; prosternal carina weakly emarginate posteriorly (Fig. 100).

Male: aedeagus with well delimited apical plate, with apex weakly produced antieriad (Fig. 84). Right paramere very slender, strongly twisted, with minute hook at apex (Fig. 85). Left paramere relatively slender (Fig. 86).

Female subgenital plate constricted, then slightly widened, and truncate distally, with many long golden setae projecting posteriorly along entire distal margin (Fig. 107).

**Comparative notes:** *Helotrephes flaviceps* sp.n. differs from other species of the group in the well developed mediolateral swellings on the hind margin of the cephalonotum (Fig. 96). In other characters it is very similar to *H. tuberculatus* sp.n., but differs in details of male genitalia: the aedeagus with a small, but well defined apical plate (Fig. 84), which is not present in any other species of the group; the right paramere has a differently shaped apex (Fig. 85); and the left paramere is more slender (Fig. 86). Differences in colouration are obvious in the specimens studied, but should be confirmed in larger samples lateron.

**Distribution:** Thailand (Mae Hong Son, Songkhla, Yala).

**Etymology:** from *flavus* (Latin, adj.) meaning "yellow", and *ceps* (Latin, subst.), meaning "head", referring to the colouration of the head which is uniformly yellow except on the extreme anterior margin.

***Helotrephes affinis* sp.n.** (Figs. 87 - 89, 95, 101)

**Holotype** (♂): "Thailand: Songkhla\ stream from Ton Nga Chang\ Waterfall, 27.XI.1995\ leg. N. Nieser N 9533" (CNT).

**Field notes:** "downstream of the Ton Nga Chang water fall, just outside park" (Nieser, pers. comm.).

**Description** (see also species group characters): Body size, brachypterous form: length 2.44 mm, width 1.83 mm. Ground colour yellowish brown to brown, with diffuse darker brown areas. Cephalonotum mostly brownish, lighter anteriorly, with dark spots along posterior margin, with several larger spots along hind margin; head anteriorly completely yellowish, with a weakly brownish area behind eyes. Mesoscutellum with base broadly brownish. Hemelytra without brown markings, but punctations appearing dark. Venter brown. Legs and antennae yellowish, legs darker distally, rostrum brown.

Cephalonotum shining, convex, set with small alveoli, in dorsal view (of entire insect) much broader than long (1.83 : 1.00), lateral margins carinate anteriorly, weakly carinate behind eyes. Pronotal plate with narrow notch (Fig. 95). Mesopleural and propleural plates not notched. Eye length : width, 0.53 : 0.35. Interocular distance 0.86. Lengths of rostral segments 3 and 4: 0.16, 0.37.

Mesoscutellum weakly shining, set with tiny depressed alveoli, each with one moderately long slender seta, each surrounded by a roughly circular transparent region; length : width, 0.97 : 1.00.

Hemelytra opaque, faintly shining, alveoli dark, depressed, each with a moderately long slender seta. Ventral carinae prominent; prosternal carina posteriorly more emarginate than in other species of the group (Fig. 101).

Male: apex of aedeagus formed by a relatively large, oblique, and truncated lamina (Fig. 87). Right paramere apically widened (Fig. 88). Left paramere distally relatively slender (Fig. 89).

Female unknown.

**Comparative notes:** *Helotrephes affinis* sp.n. differs from the other five species of the *H. otoe*s group especially in the apex of the aedeagus (Fig. 87). The apex of the left paramere is similar to *H. otoe*s from North Borneo, but the carinae of abdominal sternites 4 - 6 are more developed than in this species. Externally, females (presently unknown) should be distinguishable by the narrow notch of the propleural plate (Fig. 95), which is shallow and wide in other species of the group (Fig. 90 - 94).

**Distribution:** Thailand (Songkhla).

**Etymology:** *affinis* (Latin, adj.), meaning "closely related with", referring to the general appearance of the species which is similar to *H. tuberculatus* sp.n. and *H. flaviceps* sp.n. distributed in the same area.

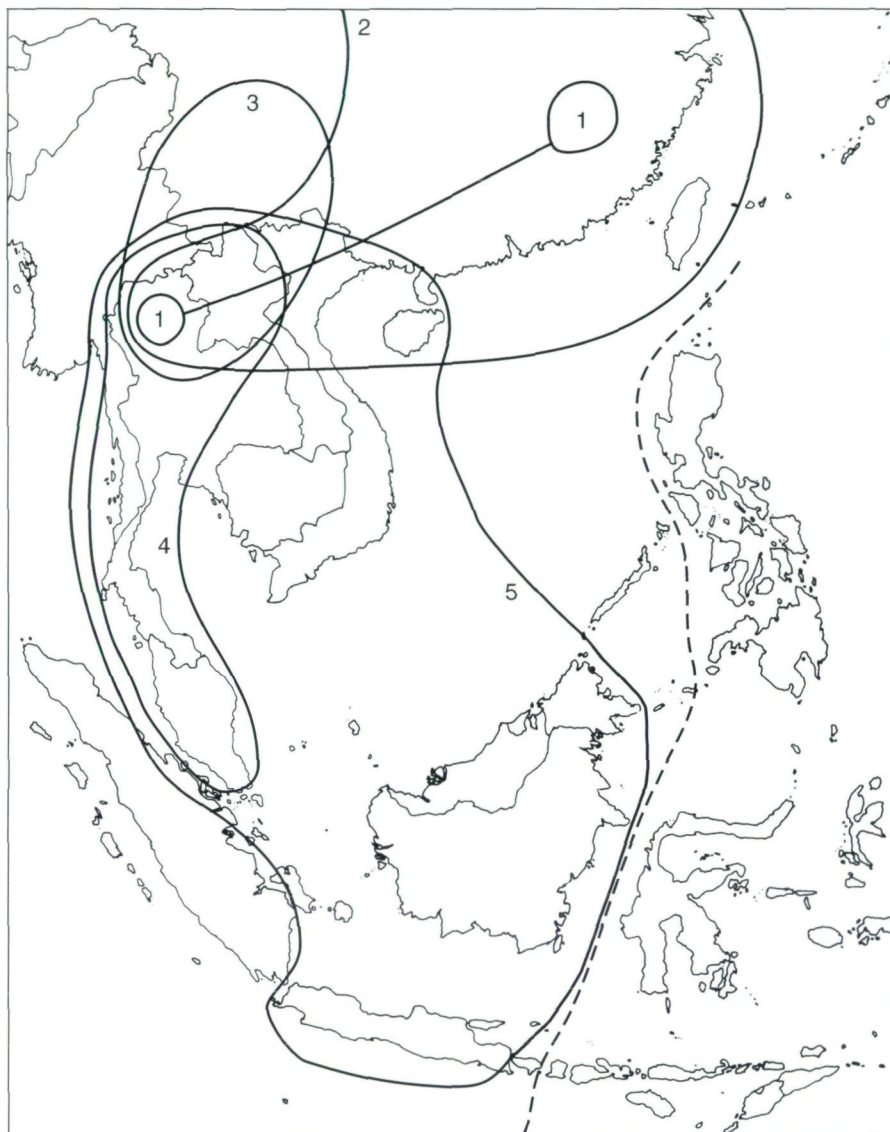


Fig. 108: Distribution of *Helotrephes* species groups: 1: *H. jendeki* group; 2: *H. semi-globosus* group; 3: *H. sausai* group; 4: *H. australis* group; 5: *H. otoe* group; dotted line: Wallace's Line (after DICKERSON & al. 1928).

### Zoogeography of species groups

Although the research on the distribution of *Helotrephes* species is still in an initial stage, and future data will probably change the present knowledge, a preliminary analysis of the distribution of species groups is presented in Figure 108.

*Helotrephes* is an East-Oriental genus, limited to the East by Wallace's Line, its most western records presently from North Thailand, its most northern from China (Anhui), and its most southern from Java. Three species groups (the *H. jendeki* [1], *H. semiglobosus* - [2], and *H. sausai* group [3]) have a South Chinese - Indochinese distribution, of which the *H. semiglobosus* group reaches farthest northward to the transitional zone between the Oriental and the Palearctic Realms. The *H. australis* group [4] has an Indochinese - Malayan distribution, whereas the *H. otoeis* group [5] may be called Indochinese - Westmalesian.

As presently known, the highest species diversity is found in Thailand (9 species), followed by China (excl. Taiwan; 4), Malaysia (3), and Laos (3); only single species are recorded from Vietnam, Taiwan, and Indonesia (see check-list of species), although another new species closely allied to *H. porntipae* sp.n. was very recently collected in southern Vietnam by the second author.

### Check-list of species groups, species, and subspecies

New records are marked by an asterisk (\*).

#### ***Helotrephes jendeki* group:**

*jendeki* ZETTEL, 1995

China: Jianxi

*porntipae* sp.n.

Thailand: Chiang Mai\*

#### ***Helotrephes semiglobosus* group:**

*semiglobosus semiglobosus* STÅL, 1860

China: Sichuan\*, Anhui\*,  
Zhejiang, Jiangxi, Fujian\*,  
Guangdong, Hong Kong,  
Guangxi

*semiglobosus formosanus* ESAKI & MIYAMOTO, 1943

Taiwan

*semiglobosus hainanicus* ssp.n.

China: Hainan\*

*shepardi* sp.n.

Thailand: Chiang Mai\*,  
Phetchabun\*,  
Vietnam: Vinh Phu\*

#### ***Helotrephes sausai* group:**

*sausai* ZETTEL, 1995

China: Yunnan

*major* sp.n.

Thailand: Chiang Mai\*

sp. aff. *major* sp.n.

Laos: Luang Nam Tha\*

#### ***Helotrephes australis* group:**

*australis* sp.n.

Thailand: Mae Hong Son\*,  
Chiang Mai\*, Chayaphum\*,  
Narathiwat\*, Trang\*,  
Songkhla\*, Yala\*,  
Laos: Luang Nam Tha\*,  
Malaysia: Selangor\*, Pahang\*

|  |   |
|--|---|
| <i>incisus</i> sp.n.                   | Thailand: Phetchabun*,<br>Chiang Mai*                           |
| <i>nieserianus</i> sp.n.               | Thailand: Mae Hong Son*,<br>Chiang Mai*<br>Laos: Luang Nam Tha* |
| <b><i>Helotrephes otoe</i> group:</b>  |   |
| <i>otoe</i> s NIESER & CHEN (in press) | Malaysia: Sabah   |
| <i>kodadai</i> sp.n.                   | Malaysia: Sarawak*  |
| <i>javanicus</i> sp.n.                 | Indonesia: Jawa Barat*  |
| <i>tuberculatus</i> sp.n.              | Thailand: Phetchabun*<br>China: Hainan*                         |
| <i>flaviceps</i> sp.n.                 | Thailand: Mae Hong Son*,<br>Yala*, Songkhla*                    |
| <i>affinis</i> sp.n.                   | Thailand: Songkhla*   |

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